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Bibliography of Publications of the Coastal Engineering Research Center and the Beach Erosion Board

ORIGIN

by

Andre Szuwalski and Linda Clark

JUNE 1980

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U.S. ARMY, CORPS OF ENGINEERS
COASTAL ENGINEERING RESEARCH CENTER
Kingman Building
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This bibliography includes a listing of publications issued by the Coastal Engineering Research Center (CERC) and the Beach Erosion Board (BEB).

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PREFACE

This bibliography covers literature published by the Coastal Engineering Research Center (CERC) and the Beach Erosion Board (BEB), predecessor to CERC.

Publications issued by CERC (from 1963) are listed with annotations accompanying each bibliographic entry. Indexes of authors and keywords are also included. Publications issued before 1963 by the BEB are listed without annotations. Annotations for the BEB reports can be found in CERC's Miscellaneous Paper No. 1-68, titled, "Annotated Bibliography of BEB and CERC Publications."

This bibliography was compiled and annotated by Andre Szuwalski and Linda Clark of the Coastal Engineering Information and Analysis Center (CEIAC), under the general supervision of Dennis W. Berg, Chief, Technical Information Division.

Comments on this publication are invited.

Approved for publication in accordance with Public Law 166, 79th Congress, approved 31 July 1945, as supplemented by Public Law 172, 88th Congress, approved 7 November 1963.

TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

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CONTENTS

		Page
I	INTRODUCTION	1-5
II	BIBLIOGRAPHY FORMAT	1-6
III	DISTRIBUTION OF PUBLICATIONS	1-7
IV	PURCHASE OF PUBLICATIONS	1-7
V	LIBRARY LOAN	1-8
VI	ANNOTATED CERC BIBLIOGRAPHY	1-8
	1. Shore Protection Manual	1-8
	2. Technical Reports	2-1
	3. Miscellaneous Reports	3-1
	4. Technical Papers	4-1
	5. Coastal Engineering Technical Aids	5-1
	6. Special Reports	6-1
	7. General Investigation of Tidal Inlets	7-1
	8. Reprints	8-1
	9. Technical Memorandums	9-1
	10. Miscellaneous Papers	10-1
VII	BEB BIBLIOGRAPHY	11-1
	11. BEB Technical Memorandums	11-1
	12. BEB Miscellaneous Papers	12-1
APPENDIX		
A	AUTHOR INDEX OF CERC PUBLICATIONS	A-1
B	SUBJECT INDEX OF CERC PUBLICATIONS	B-1
C	KEYWORDS	C-1

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BIBLIOGRAPHY OF PUBLICATIONS of the COASTAL ENGINEERING RESEARCH CENTER and the BEACH EROSION BOARD

by

Andre Szuwalski and Linda Clark

I. INTRODUCTION

This bibliography includes a listing of publications issued by the Coastal Engineering Research Center (CERC) and the Beach Erosion Board (BEB), predecessor to CERC. Publications issued by CERC (from 1963) are listed with annotations accompanying each bibliographic entry. Publications issued before 1963 by the BEB are listed without annotations. Annotations for the BEB reports can be found in CERC's Miscellaneous Paper No. 1-68, titled, "Annotated Bibliography of BEB and CERC Publications."

The publications currently issued by CERC are briefly identified as follows:

Shore Protection Manual (SPM)—a three-volume manual covering guidelines and techniques for functional and structural design of shore protection works.

Technical Reports (TR)—reports of major significance, containing results of research and development efforts having significant value, or of major engineering studies.

Miscellaneous Reports (MR) and **Technical Papers (TP)**—reports of lesser significance, or lesser scope than a Technical Report.

Coastal Engineering Technical Aids (CETA)—reports giving (solely) methods, techniques, or guidelines directly usable by Corps of Engineers field offices for direct application to project planning or design. These are basically design manuals, and give methods, but not background information. The material in the CETA may be completely new, or may have formed a part of, or be excerpted from another publication. This series, which began in 1976, was originally designated as Coastal Design Memorandum (CDM).

Special Reports (SR)—reports of such lasting value or wide public interest as to warrant publication by the Government Printing Office (GPO) as a salable document.

General Investigation of Tidal Inlets (GITI)—a special series of reports published jointly by CERC and the U.S. Army Engineer Waterways Experiment Station (WES) reporting on a major study concerning tidal inlets.

Reprints (R)—those reports published by CERC personnel in professional journals or magazines selected for wider distribution.

CERCular—a quarterly information bulletin which provides information on CERC's progress in coastal engineering research, and includes a listing of the latest CERC publications. The CERCular is not listed in this bibliography.

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CERC formerly issued two series of publications designated as Technical Memorandums (TM) and Miscellaneous Papers (MP) which covered general subjects on research and development. Both series were discontinued in December 1975.

CERC also issued a Bulletin and Summary of Research Progress series. Four volumes of the series were published; Volume IV (1970-71) was the last volume issued. Information on CERC's research progress is included in the new quarterly CERCular. The Bulletin series is not listed in this bibliography.

II. BIBLIOGRAPHY FORMAT

All CERC publications presented in this bibliography are in the following sample format:

SAMPLE

(1) (2)

MR 76-1* A022 653

(3)

SHERK, J.A., Jr., O'CONNOR, J.M., and NEUMANN, D.A., "Effects of Suspended Solids on Selected Estuarine Plankton," Jan. 1976.

(4)

Keywords: *Biological components, Dredge spoil, Estuarine plankton, Sediments, Suspended sediments*

(5)

A 3-year laboratory study identified biological components of selected populations of estuarine organisms most sensitive to the effects of different suspended sediments.

1. **Report Series/Number.** This is a CERC identification designation giving the type and number of the report. This designation should be used when requesting reports from CERC (an asterisk after the report number indicates that the publication is no longer available at CERC).

2. **Accession Number.** This is a number assigned by the Defense Documentation Center (DDC) and must be used when ordering CERC publications from the National Technical Information Service (NTIS).

3. **Author/Title/Date.** Includes author(s), title, and date of publication.

4. **Keywords.** Selected descriptors identifying topics discussed in or relevant to the report.

5. **Annotation.** A brief description of the content of the report.

An author index (App. A) and a subject index (App. B) based on the selected keywords assigned to each publication are included to aid users of this bibliography. A complete list of keywords is in Appendix C.

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III. DISTRIBUTION OF PUBLICATIONS

Publications of the Coastal Engineering Research Center are distributed primarily to Department of Defense and certain other Federal agencies, State agencies, and universities and colleges having an interest in the work reported. Copies remaining after the initial distribution are furnished without charge on request until CERC's supply of the particular report is exhausted. Requests for publications, or to be placed on the mailing list to receive the CERCular bulletin, should be addressed to:

U.S. Army Coastal Engineering Research Center
Technical Information Division
Coastal Engineering Information and Analysis Center (CERTI-CE)
Kingman Building,
Fort Belvoir, Virginia 22060

When requesting publications from CERC, refer to the type of publication (i.e., TR, R, GITI, etc.) and accompanying number.

IV. PURCHASE OF PUBLICATIONS

Publications which are no longer available at CERC (identified by an astrisk [*] after the series number) can be purchased from:

National Technical Information Service (NTIS)
ATTN: Operations Division
5285 Port Royal Road
Springfield, Virginia 22161
(703) 557-4650

Costs of hard copies or microfiche copies of CERC reports are available from NTIS on request. When ordering from NTIS always refer to the accession number. The Shore Protection Manual (p. 1-8) and Special Reports (p. 6-1) can be purchased from:

Superintendent of Documents
U.S. Government Printing Office (GPO)
North Capitol and H Streets, NW.
Washington, D.C. 20401
(202) 783-3238

When ordering from GPO use the stock number of the publication.

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V. LIBRARY LOAN

Library copies of all CERC publications and any other engineering literature on file in CERC's library are available to Department of Defense agencies on loan from the Library Branch. The library loan privilege is also extended to other Federal and State agencies, scientific and educational institutions, and established engineering or industrial firms. In such cases, the loan period is usually limited to 30 days. Individuals not connected with the Department of Defense can usually arrange for library loan either through the main offices of their business concerns or through the interlibrary loan services of their local libraries. Lending to persons outside the continental limits of the United States is not encouraged because of the extended time periods involved and risk of loss in transit. Loan requests should be addressed to:

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VI. ANNOTATED BIBLIOGRAPHY

1. SHORE PROTECTION MANUAL

SPM . . . . . GPO Stock No. 008-002-00113-1

U.S. ARMY, CORPS OF ENGINEERS, COASTAL ENGINEERING RESEARCH CENTER, "Shore Protection Manual," 1977.

Keywords: *Coastal engineering*

This Shore Protection Manual (SPM), published in three volumes, was written and edited by the staff of the Coastal Engineering Research Center. It is a comprehensive manual written for engineers concerned with designing jetties, seawalls, bulkheads, revetments, and groins for protection of beaches and coastal harbors from the interaction of waves, winds, tides, and currents. The cost of the set is $17.25, postpaid, for addresses in the United States and Canada and $20.56, postpaid, for addresses in other foreign countries.

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2. TECHNICAL REPORTS

TR 76-1* **A023 191**

HANDS, E.B., "Observations of Barred Coastal Profiles Under the Influence of Rising Water Levels, Eastern Lake Michigan, 1967-71," Jan. 1976.

Keywords: *Lake levels, Lake Michigan, Longshore bars, Pentwater Harbor, Michigan, Profiles*

Descriptions of lakeshore bathymetry and its temporal variation over a 4-year period are based on 125 shore-normal profiles from 35 stations and aerial photos covering 50 kilometers of shore near Pentwater Harbor on the eastern shore of Lake Michigan.

TR 76-2* **A030 423**

WOODHOUSE, W.W., Jr., SENECA, E.D., and BROOME, S.W., "Propagation and Use of Spartina alterniflora for Shoreline Erosion Abatement," Aug. 1976.

Keywords: *Bogue Sound, North Carolina, Fertilization, Marsh vegetation, Spartina alterniflora, Transplanting*

This report contains the results of experiments in the use of marsh vegetation to protect eroding shorelines, a laboratory study on mineral nutrition of *Spartina alterniflora*, and an additional year of monitoring several trials previously described by these authors.

TR 76-3* . . . . . **(Vol. I)---A034 763**

WANSTRATH, J.J., et al., "Theory and Application," *Storm Surge Simulation in Transformed Coordinates*, Nov. 1976.

Keywords: *Computer programs, Coordinate transformation, Hurricane Camille, Hurricane Carla, Hurricane Gracie, Hurricanes, Mathematical models, Storm surge*

Report discusses a two-dimensional time-dependent numerical storm surge model using orthogonal curvilinear coordinates. Model is used in simulating storm surge induced by selected hurricanes.

TR 76-3 . . . . . **(Vol. II)---A034 651**

WANSTRATH, J.J., "Program Documentation," *Storm Surge Simulation in Transformed Coordinates*, Nov. 1976.

Keywords: *Computer programs, Coordinate transformation, Hurricane Camille, Hurricane Carla, Hurricane Gracie, Hurricanes, Mathematical models, Storm surge*

Report discusses a two-dimensional time-dependent numerical storm surge model using orthogonal curvilinear coordinates. Model is used in simulating storm surge induced by selected hurricanes.

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TR 77-1* **A037 904**

THOMPSON, E.F., "Wave Climate at Selected Locations Along U.S. Coasts," Jan. 1977.

Keywords: *Atlantic coast, Gulf coast, Pacific coast, Wave climate, Wave gages, Wave heights, Wave periods*

Report summarizes significant heights and periods for 19 wave gage locations, and provides data on ranges, annual and seasonal variations of wave climate. Staff and pressure-sensitive gages, generally shore-based, were used to obtain the data.

TR 78-1 . . . . . **A063 935**

THOMPSON, E.F., "An Evaluation of Two Great Lakes Wave Models," Oct. 1978.

Keywords: *Hindcasting, Mathematical models, Wave heights, Wave periods*

Two operational numerical Great Lakes wave models are described in detail and evaluated. Evaluation of one model developed by the U.S. Army Engineer Waterways Experiment Station (WES) compared wave hindcasts for nine storms in Lake Erie during fall 1975; evaluation of other model developed by Techniques Development Laboratory (TDL), National Weather Service, compared forecasts during fall 1975 and fall 1976 in Lake Erie and Lake Michigan.

TR 79-1 . . . . . **A076 307**

MATTIE, M.G., and HARRIS, D.L., "A System for Using Radar to Record Wave Direction," Sept. 1979.

Keywords: *Aerial photography, Radar, Waves*

Report describes a radar system that provides images of waves in the coastal zone to obtain wave direction information. Data obtained from radar images are compared with similar data obtained from aerial photos and other observational techniques.

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3. MISCELLANEOUS REPORTS

MR 76-1* **A022 653**

SHERK, J.A., Jr., O'CONNOR, J.M., and NEUMANN, D.A., "Effects of Suspended Solids on Selected Estuarine Plankton," Jan. 1976.

Keywords: *Biological components, Dredge spoil, Estuarine plankton, Sediments, Suspended sediments*

A 3-year laboratory study identified biological components of selected populations of estuarine organisms most sensitive to the effects of different suspended sediments.

MR 76-2 . . . . . **A022 336**

MILLER, G.H., and BERG, D.W., "An ERTS-1 Study of Coastal Features on the North Carolina Coast," Jan. 1976.

Keywords: *ERTS, Morphological changes, Multispectral scanner, North Carolina, Remote sensing, Satellites, Sediments*

Unenhanced imagery recorded by the multispectral scanner (MSS) of the NASA Earth Resources Technology Satellite (ERTS-1) was analyzed to determine how satellite imagery may be applied to specific coastal engineering problems.

MR 76-3* **A023 178**

SENECA, E.D., WOODHOUSE, W.W., Jr., and BROOME, S.W., "Dune Stabilization with Panicum amarum Along the North Carolina Coast," Feb. 1976.

Keywords: *American beachgrass, Bitter panicum, Dune building, Dune stabilization, Dunes, North Carolina, Sea oats, Transplanting, Vegetation*

This study was conducted to determine the dune stabilizing and dune building potential of *Panicum amarum* (bitter panicum) along the North Carolina coast.

MR 76-4* **A022 337**

AYERS, J., and STOKES, R., "Simplified Design Methods of Treated Timber Structures for Shore, Beach, and Marina Construction," Mar. 1976.

Keywords: *Bulkheads, Groins, Marine engineering, Piers, Pressure-treated timber, Seawalls*

Pressure-treated timber has wide application in waterfront and shore protection structures built in marina developments and other shore and beach locations bordering on bays, lakes, and river resorts, and is the principal construction material for bulkheads, seawalls, piers, and groins at locations with mild exposure and shallow-to-intermediate water depths.

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MR 76-5* **A023 682**

MADSEN, O.S., and WHITE, S.M., "Reflection and Transmission Characteristics of Porous Rubble-Mound Breakwaters," Mar. 1976.

Keywords: ***Breakwaters, Friction factor, Reflection coefficient, Rubble-mound breakwaters, Transmission coefficient, Wave reflection, Wave transmission***

This report presents the results of a study of the reflection and transmission characteristics of porous rubble-mound breakwaters, introducing empirical relationships for hydraulic characteristics of the porous material and the friction factor that expresses energy dissipation on the seaward slope of a breakwater.

MR 76-6 . . . . . **A025 178**

LEVY, G.F., "Vegetative Study at the Duck Field Research Facility, Duck, North Carolina," Apr. 1976.

Keywords: ***Duck, North Carolina, Dunes, Field Research Facility–CERC, Floristics, Phytosociology, Plant ecology, Vegetation***

A vegetative study of the Duck Field Research Facility of the U.S. Army Coastal Engineering Research Center at Duck, North Carolina, was conducted from March 1974 through June 1975. Eleven different plant communities were delimited. Floristic collections made throughout the study period revealed a flora of approximately 178 species in 132 genera representing 58 families.

MR 76-7* **A026 255**

McCARTNEY, B.L., "Survey of Coastal Revetment Types," May 1976.

Keywords: ***Filters, Revetments***

A review of 25 selected revetment types and a procedure for revetment design which includes identification of controlling site conditions, a comparative cost analysis method, and an example problem are presented. Design data include prototype installation examples, available model test results, and estimates of zero-damage wave heights, wave runup, and revetment wave reflection properties.

MR 76-8* **A028 275**

PRITCHETT, P.C., "Diurnal Variations in Visually Observed Breaking Waves," May 1976.

Keywords: ***Breakers, Sea breeze***

In over 53,000 visual observations made four times daily during June, July, and August at 17 U.S. Coast Guard stations on the Atlantic, Pacific, and gulf coasts of the United States, the average monthly diurnal variations in breaker height ranged from 0.05 to 0.36 foot; diurnal variations averaged about 10 percent of the monthly mean height.

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MR 76-9* **A028 274**

AHRENS, J., "Wave Attenuation by Artificial Seaweed," June 1976.

Keywords: *Artificial seaweed, Seaweed, Wave attenuation, Waves*

A series of wave tank tests was conducted at CERC to determine the ability of a field of low specific gravity artificial seaweed to attenuate wave action. Ten distinct wave conditions, using 2.6- to 8.2-second periods, 24- to 110-centimeter wave heights, and a 2.4-meter stillwater depth, were tested.

MR 76-10* **A031 992**

SALOMAN, C.H., "The Benthic Fauna and Sediments of the Nearshore Zone off Panama City Beach, Florida," Aug. 1976.

Keywords: *Coastal fauna, Hurricane Eloise, Panama City Beach, Florida, Sediments*

This study presents basic scientific data on the benthic fauna and surface sediments of the nearshore zone of Panama City Beach, Florida, before restoration of the beach, and the results of a study on the effect of Hurricane Eloise on the benthic fauna in the swash zone of Panama City Beach.

MR 76-11* **A033 041**

TELEKI, P.G., MUSIALOWSKI, F.R., and **PRINS, D.A.**, "Measurement Techniques for Coastal Waves and Currents," Nov. 1976.

Keywords: *Current meters, Dye tracers, Instrumentation, Sea sled, Telemetry, Wave gages, Waves*

Report discusses a mobile battery-operated system (TODAS) consisting of a towed platform (sea sled) with current meters and a wave gage, developed for collection of data on nearshore currents and waves. TODAS can be used for real-time evaluation of flow characteristics between shore and a depth of 9.14 meters.

MR 77-1 . . . . . **A038 593**

LOFQUIST, K.E.B., "A Positive Displacement Oscillatory Water Tunnel," Feb. 1977.

Keywords: *Sediment transport, Water tunnel, Waves*

Report documents the design, construction, and operation of an oscillating water tunnel. Test section of facility replicates prototype conditions at the seabed under sinusoidal waves offshore of the breaker zone. Water tunnel has performed satisfactorily for over 2 years in studies of sand movement and transport.

MR 77-2 . . . . . **A038 747**

BOWIE, G.L., and **WIEGEL, R.L.**, "Marine Pipelines: An Annotated Bibliography," Mar. 1977.

Keywords: *Bibliographies, Pipelines*

This annotated bibliography presents a compilation of literature describing the design, construction, operation, and maintenance of pipelines in the ocean and rivers. The problems encountered in installing and repairing pipelines are discussed.

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MR 77-3 . . . . . A040 082

RAMSEY, M.D., and GALVIN, C.J., Jr., "Size Analysis of Sand Samples from Southern New Jersey Beaches," Mar. 1977.

Keywords: *Beach Evaluation Program–CERC, New Jersey–Atlantic City, Brigantine, Island Beach, Long Beach Island, and Ludlam Island, Sand-size analysis, Sediments*

The size of sand on Atlantic coast beaches of southern New Jersey was studied by analyzing 788 sand samples. In north-to-south order, the samples were collected at Island Beach, Long Beach Island, Brigantine, Atlantic City, and Ludlam Island. The results in this report provide site-specific engineering data for New Jersey beaches, and suggest ways to improve beach fills at these sites.

MR 77-4 . . . . . A039 265

RAY, R.E., "A Laboratory Study of the Stability of Sand-Filled Nylon Bag Breakwater Structures," Mar. 1977.

Keywords: *Breakwaters, Sandbags, Waves*

Report discusses results of full-scale laboratory tests for one emergent and three submerged breakwaters of sandfilled nylon bags on a sand bed which were subjected to severe wave conditions. Tests determined bag properties, effects of wave action on bag placement, and performance of bags and structures for various combinations of structure configuration and wave conditions. Changes in the sand bed at base of structures and wave attenuation by the breakwaters were also investigated.

MR 77-5 . . . . . A039 266

ABELE, R.W., Jr., "Analysis of Short-Term Variations in Beach Morphology (and Concurrent Dynamic Processes) for Summer and Winter Periods, 1971-72, Plum Island, Massachusetts," Mar. 1977.

Keywords: *Breakers, Currents, Meteorological data, Plum Island, Massachusetts, Profiles, Waves*

Report analyzes the relationship between wave and meteorological variables and beach morphology during summer and winter periods, 1971-72, at Plum Island, Massachusetts. Variations in beach process variables were directly related to storm systems in the area.

MR 77-6 . . . . . A040 593

MATTA, J.F., "Beach Fauna Study of the CERC Field Research Facility, Duck, North Carolina," Apr. 1977.

Keywords: *Coastal fauna, Duck, North Carolina, Field Research Facility–CERC*

The results of an intensive seasonal study of the beach fauna of a barrier island in Dare County, North Carolina, are presented. Study areas include the beach face from margin of the swash zone to 60 meters offshore on the ocean beach, and from swash zone to 300 meters offshore on the sound beach. A simple quantitative sampling device was also developed for use in the surf zone.

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MR 77-7 . . . . . (Vol. I)---A043 870

STAFFORD, R.P., and CHESNUTT, C.B., "Procedures Used in 10 Movable-Bed Experiments," *Laboratory Effects in Beach Studies*, June 1977.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

Ten experiments were conducted at the Coastal Engineering Research Center (CERC) from 1970 to 1972 as part of an investigation of the Laboratory Effects in Beach Studies (LEBS), to relate wave height variability to wave reflection from a movable-bed profile in a wave tank. The investigation also identified the effects of other laboratory constraints. A series of eight volumes documents the results of these experiments.

Volume I contains the procedures developed and conditions existing during 10 experiments on LEBS as a convenient reference to the analyses of LEBS data reported in separate volumes. This report also serves as a procedural manual for a common type of coastal engineering experiment, and it describes the wave generators used to produce data published in previous reports by CERC. Special attention is given to the problem of running movable-bed experiments in outdoor facilities. Recordkeeping, construction of initial profile, water level control, wave height measurement, analysis of wave envelopes, ripple effects on profile accuracy, temperature measurement, and observation of breakers and currents are also discussed.

MR 77-7 . . . . . (Vol. II)---A045 462

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.021 (1970)," *Laboratory Effects in Beach Studies*, Aug. 1977.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

Two movable-bed experiments were conducted in 6- and 10-foot-wide tanks for 175 and 210 hours, respectively, with a wave period of 1.90 seconds and generated wave height of 0.36 foot. The reflection coefficient from the changing profile varied from 0.08 to 0.20 in the 6-foot tank and 0.04 to 0.19 in the 10-foot tank and the variations can be qualitatively related to changes in the profile shape. The experiments suggest that tank width and length, and water temperature affect laboratory profile development and that under common laboratory conditions the profiles approach equilibrium more slowly than normally assumed.

MR 77-7 . . . . . (Vol. III)---A049 871

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.021 (1971)," *Laboratory Effects in Beach Studies*, Nov. 1977.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

Two movable-bed experiments were conducted in 6- and 10-foot-wide wave tanks for 375 and 335 hours, respectively, with a wave period of 1.90 seconds and a generated wave height of 0.36 foot.

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Significant lateral variations occurred in the profile development rate and profile shape in the 10-foot tank, which did not occur in the 6-foot tank, indicating that tank width can affect the study of littoral processes in movable-bed experiments.

Wave reflection from the movable-bed profile varied considerably as the profile in both wave tanks developed from an initial planar (0.10) slope to one closer to equilibrium. The reflection coefficient, K_R can be related qualitatively to profile development.

Even with the fine-grained, well-sorted sediment used, a measurable sorting occurred as the finer material was eroded and deposited offshore.

MR 77-7 . . . . . **(Vol. IV)---A051 872**

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.021 (1972)," *Laboratory Effects in Beach Studies*, Dec. 1977.

Keywords: ***Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks***

A two-dimensional movable-bed experiment was conducted in a 6-foot-wide wave tank for 180 hours, with a wave period of 1.90 seconds and a generated wave height of 0.36 foot. The profile had an initial slope of 0.05, which was flatter than the profiles in earlier experiments (0.10 in Vols. II and III of the series) and developed a different profile shape. The profile never reached equilibrium, although the shoreline stopped retreating and the water temperature was relatively constant for the last 80 hours. Even with the fine-grained, well-sorted sediment used, a measurable sorting occurred as the finer material was eroded and deposited on other parts of the profile.

The reflection coefficeint, K_R, varied from 0.04 to 0.27 and the variations in K_R can be related qualitatively to profile development. The reflection coefficient from the foreshore zone was between 0.06 and 0.12. The large variation in the total profile K_R appears to be the result of changes in the elevation of the offshore reflecting zone and changes in the distance between the foreshore and offshore reflecting zones.

MR 77-7 . . . . . **(Vol. V)---A051 484**

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.039," *Laboratory Effects in Beach Studies*, Dec. 1977.

Keywords: ***Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks***

In an experiment with a wavelength of 10.26 feet (wave period = 1.50 seconds) on an initial movable-bed slope of 0.10 in a tank 10 feet wide with waves directed normal to the initial shoreline, the foreshore and inshore changes of the profile were three-dimensional to such an extent that a longshore current developed at the base of the foreshore. Comparable experiments in the same facility, but with a longer wavelength, did not show three-dimensional effects to as great an extent. As a working hypothesis, it is proposed that the shorter the wavelength in a movable-bed experiment relative to a given tank width, the greater the likelihood of three-dimensional effects in profile development.

BEST DOCUMENT AVAILABLE

MR 77-7 . . . . . (Vol. VI)--A055 186

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.004," *Laboratory Effects in Beach Studies*, Mar. 1978.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

Two experiments with long low waves on 0.2-millimeter sand slopes in tanks 6 to 10 feet wide showed very different development, apparently because current circulation, present only in the 6-foot tank, was more effective in distributing sand in the onshore-offshore direction. In the 6-foot tank, the profile developed a more distinct shelf separated by two relatively steep seaward-facing slopes. The clockwise circulation pattern occurred over the shelf between the foreshore and the first seaward antinode of the standing wave envelope, a distance approximately twice the tank width. This current pattern in the 6-foot tank began to disintegrate after about 70 hours.

The reflection coefficient, K_R, varied from 0.17 to 0.31 in the 6-foot tank, increasing as the shelf developed during the time of active circulation. K_R then began decreasing as the steep offshore slope began flattening. In the 10-foot tank, K_R was higher, varying from 0.24 to 0.37 and tended to increase with steepening of the foreshore.

MR 77-7 . . . . . (Vol. VII)---A055 021

CHESNUTT, C.B., and STAFFORD, R.P., "Movable-Bed Experiments with H_o/L_o = 0.013," *Laboratory Effects in Beach Studies*, Mar. 1978.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

In two experiments with a wave period of 2.35 seconds on an initial movable-bed slope of 0.10 in tanks 6 and 10 feet wide, significant differences in profile shape and wave height variability developed. Secondary wave and re-reflection effects resulting from the 38.3-foot difference in distance from the wave generator to the profile toe caused differences in the shape of the offshore zone. The 0.15-foot gap at the end of the generator blade in the 10-foot tank and the critical combination of wavelength and tank width generated a transverse wave. The transverse wave affected the profile shape—the shoreline became skewed, the depth over the shelf in the offshore zone increased laterally, and changes in the inshore zone progressed from one side of the tank to the other during the course of the experiment.

The reflection coefficient K_R, varied from 0.03 to 0.14 in the 6-foot tank and the average in the 10-foot tank varied from 0.11 to 0.24, with considerable lateral variation. Changes in K_R in the 10-foot tank correlated well with changes in the shape of the upper part of the offshore zone.

BEST DOCUMENT AVAILABLE

MR 77-7 . . . . . .(Vol. VIII)---A058 703

CHESNUTT, C.B., "Analysis of Results from 10 Movable-Bed Experiments," *Laboratory Effects in Beach Studies*, June 1978.

Keywords: *Laboratory wave facilities, Movable-bed modeling, Profiles, Sediments, Water temperature, Wave height variability, Wave reflection, Wave tanks*

Volume VIII, the last in a series of eight volumes on the Laboratory Effects in Beach Studies (LEBS) experiments, is a comprehensive analysis of results from the 10 LEBS experiments conducted at CERC from 1970 to 1972. This volume includes a further analysis of each experiment and how it relates to the other nine experiments on wave height variability, profile equilibrium, and laboratory effects.

MR 77-8 . . . . . A043 875

DAHL, B.E., and GOEN, J.P., "Monitoring of Foredunes on Padre Island, Texas," July 1977.

Keywords: *Dunes, Padre Island, Texas, Vegetation*

This study was conducted to continue monitoring foredunes formed from grass plantings during 1969 to 1973 on north Padre Island beaches. The report summarizes data obtained from elevational profiles and vegetative transects at one natural foredune and four experimental foredunes during 1975 and 1976.

MR 77-9 . . . . . A045 469

QUINN, M.L., "The History of the Beach Erosion Board, U.S. Army, Corps of Engineers, 1930-63," Aug. 1977.

Keywords: *Beach Erosion Board, History*

This report provides an accurate record of the 33-year history of the Beach Erosion Board (BEB), predecessor of the Coastal Engineering Research Center (CERC). The report discusses the events which led to the creation of the BEB, and the significant effects these events had upon the BEB's course of direction.

MR 77-10 . . . . . A047 641

LE MEHAUTE, B., and SOLDATE M., "Mathematical Modeling of Shoreline Evolution," Oct. 1977.

Keywords: *Mathematical models, Sediment transport, Shoreline evolution*

A critical literature survey on mathematical modeling of shoreline evolution is presented. The emphasis is on long-term evolution rather than seasonal or evolution taking place during a storm. The one-line theory of Pelnard-Considere (1956) is developed along with a number of applications. Refinements to the theory are introduced by considering changes of beach slope, wave diffraction effects, wave variation, and variation of sea level. The case of hooked bays is also reviewed.

BEST DOCUMENT AVAILABLE

MR 77-11 . . . . . A049 132

MEISBURGER, E.P., "Sand Resources on the Inner Continental Shelf of the Cape Fear Region, North Carolina," Nov. 1977.

Keywords: *ICONS, Sediments, Seismic reflection*

The Inner Continental Shelf of North Carolina between the South Carolina border and Cape Lookout was investigated to obtain information on bottom and subbottom sediment deposits and geologic structure. Primary survey coverage consists of 512 statute miles of high-resolution seismic reflection profiles and 124 cores ranging in length from 2 to 20 feet.

MR 77-12 . . . . . A049 563

GOLDSMITH, V., STURM, S.C., and THOMAS, G.R., "Beach Erosion and Accretion at Virginia Beach, Virginia, and Vicinity," Dec. 1977.

Keywords: *Profiles, Sediments, Virginia Beach, Virginia, Waves*

Eighteen profile lines from Fort Story south to the Virginia-North Carolina State line were surveyed monthly for 27 months (September 1974 to December 1976). Net volume changes were moderate, with maximum rates of accretion at the north and south ends of the study area. A statistical analysis using earlier surveys going back to November 1956 confirms the pattern of accretion in the north and south separated by erosion in the middle. Maximum annualized accretion rate during the 27-month study was 18.9 cubic meters per meter of beach front per year at profile line 1 (Fort Story), and maximum erosion rate of 11.6 cubic meters per year at profile line 9 (Sandbridge). The ridge-and-runnel morphology typical of many active shorelines was not observed in the study area.

MR 78-1 . . . . . A053 285

WEBB, J.W., and DODD, J.D., "Shoreline Plant Establishment and Use of a Wave-Stilling Device," Jan. 1978.

Keywords: *East Bay, Texas, Tires, Transplanting, Vegetation*

The establishment and development of smooth cordgrass transplants on a 2-percent slope behind a wave-stilling device constructed of two tiers of tires strung on a cable were monitored along the north shore of East Bay, Texas. Two previous plantings on the sloped area, the first without wave protection and the second behind one tier of tires, were unsuccessful. After a second tier of tires was placed on top of the original tier, enough protection from waves was provided to allow a successful planting.

MR 78-2* A058 712

PULLEN, E.J., et al., "An Annotated Bibliography of CERC Coastal Ecology Research," May 1978.

Keywords: *Bibliographies, Ecology*

This bibliography identifies the research work that was either funded by or published by the CERC Coastal Ecology Branch from 1967 to March 1978.

BEST DOCUMENT AVAILABLE

MR 78-3 . . . . . A062 065

JOHNSON, G.F., and deWIT, L.A., "Ecological Effects of an Artificial Island, Rincon Island, Punta Gorda, California," Sept. 1978.

Keywords: *Armor units, Artificial island, Ecology, Fish, Rincon Island, California*

This report describes an 18-month study sponsored by CERC to examine ecological effects of the construction of Rincon Island, the first major artificial island to be constructed with full ocean exposure. Rincon Island's rock revetments offer a diversity of habitat features for a great variety of marine species which do not occur in adjacent natural bottom areas. The construction of the artificial island has had a major beneficial effect on local ecological conditions.

MR 78-4 . . . . . A067 308

PARR, T., DIENER, D., and LACY, S., "Effects of Beach Replenishment on the Nearshore Sand Fauna at Imperial Beach, California," Dec. 1978.

Keywords: *Beach nourishment, Imperial Beach, California, Macrofauna, Meiofauna, Sediments*

This report presents results from a study of impacted and potentially impacted sedimentary communities in and near an area where approximately 765,000 cubic meters of dredged sediment was pumped onto a coastal, exposed beach to replenish part of the shoreline at Imperial Beach, California. The aim of the study was to establish relationships between beach replenishment and measurable biological variables in the shallow-water community (e.g., composition, species abundances, and diversity) and those measurable abiotic variables (e.g., sediment type) considered important for their influence on biological community structure.

MR 79-1 . . . . . A068 981

LESNIK, J.R., "An Annotated Bibliography on Detached Breakwaters and Artificial Headlands," Feb. 1979.

Keywords: *Bibliographies, Breakwaters*

This annotated bibliography is presented to assist in the development of reliable design procedures for detached breakwaters. The references deal with topics which can be usefully applied to the design problem although many are not limited solely to the subject of detached breakwaters. Papers on wave diffraction, reflection, transmission, and overtopping are also included.

MR 79-2 . . . . . A072 924

NEWCOMBE, C.L., et al., "Bank Erosion Control With Vegetation, San Francisco Bay, California," May 1979.

Keywords: *California—San Francisco Bay and San Pablo Bay, Erosion, Marsh plants, Salt marshes, Vegetation*

During 1975 to 1978, an intertidal shoreline stabilization study was conducted to determine biological means of controlling erosion. California cordgrass (*Spartina foliosa* Trin.) and mussels (*Ischadium demissum* Dillwyn) were used in San Pablo Bay and South San Francisco Bay, California.

BEST DOCUMENT AVAILABLE

MR 79-3 . . . . . **A073 817**

MEISBURGER, E.P., WILLIAMS, S.J., and PRINS, D.A., "Sand Resources of Southeastern Lake Michigan," July 1979.

Keywords: *Geomorphology, ICONS, Lake Michigan, Sediments, Seismic reflection*

The eastern shore of Lake Michigan between Manistee, Michigan, and Burns Harbor, Indiana, was surveyed to locate offshore sand deposits suitable for use in beach restoration and maintenance. The highest potential for offshore sand resources is in the area between Whitehall and Saugatuck, Michigan. Localized deposits with good potential occur in several places between Manistee and Whitehall, Michigan, and from Saugatuck to 15 kilometers south of Benton Harbor, Michigan. The area of lowest potential is from Benton Harbor southward to Burns Harbor, Indiana, where only a thin veneer of surficial sand overlies silt and clay deposits.

MR 79-4 . . . . . **A074 393**

WILLIAMS, S.J., PRINS, D.A., and MEISBURGER, E.P., "Sediment Distribution Sand Resources, and Geologic Character of the Inner Continental Shelf Off Galveston County, Texas," July 1979.

Keywords: *Galveston County, Texas, Geomorphology, ICONS, Sediments, Seismic reflection*

About 850 square kilometers of the Texas inner shelf from High Island to Freeport was surveyed and studied, using high-resolution continuous seismic reflection profiles taken along several hundred kilometers of trackline and 34 long cores, to determine the general geologic character and surface and subbottom sediment distribution. The objective was to assess the resource potential of sand deposits suitable as fill for beach nourishment projects.

MR 79-5 . . . . . **A073 605**

DeWALL, A.E., "Beach Changes at Westhampton Beach, New York, 1962-73," Aug. 1979.

Keywords: *Beach Evaluation Program–CERC, Erosion, Groins, Profiles, Westhampton Beach, New York*

Report describes an 11-year study of beach changes at Westhampton Beach, New York, analyzed as part of the U.S. Army Coastal Engineering Research Center (CERC) Beach Evaluation Program (BEP). The report presents an analysis of beach profile changes, documents the precise location of the surveyed profile lines, and describes the survey procedures used and accuracy obtained in repetitive surveys to wading depth.

BEST DOCUMENT AVAILABLE

MR 79-6 . . . . . **A080 914**

RAY, R.E., DICKEY, M.D., and LYLES, A.M., "An Annotated Bibliography of Patents Related to Coastal Engineering," Nov. 1979.

Keywords: *Bibliographies, Coastal engineering, Patents*

Report describes a collection of 2,468 coastal engineering patents (issued by the U.S. Patent Office from 1967 to 1976) published as a separate limited-edition three-volume appendix to this report. A bibliographical guide to the collection and search aids are provided. Patent topics include coastal structures and structural components, structure protection and maintenance, construction methods and equipment, field research and survey instruments, hydraulic laboratory modeling equipment, marine pollution control apparatus, and ocean energy extraction devices.

(Vol. I)---A080 795
(Vol. II)---A080 796
APP. to MR 79-6* . . . . . **(Vol. III)---A080 797**

RAY, R.E., DICKEY, M.D., and LYLES, A.M., "An Annotated Bibliography of Patents Related to Coastal Engineering," Nov. 1979.

Keywords: *Bibliographies, Coastal engineering, Patents*

Appendix presents a three-volume collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Topics include coastal structures and structural components, structure protection and maintenance, construction methods and equipment, field research and survey instruments, hydraulic laboratory modeling equipment, marine pollution control apparatus, and ocean energy extraction devices. Abstracts and annotations for 2,468 patents are given covering the periods 1967 to 1970 (Vol. I), 1971 to 1973 (Vol. II), and 1974 to 1976 (Vol. III). Each volume includes a list of patent titles and numbers and a keyword index. Explanatory information on the overall collection and its use is given in Volume I. Volumes I, II, and III are not in stock at CERC. They can be obtained from the National Technical Information Service.

MR 80-1 (I) . . . . . **(Vol. I)---A083 595**

COURTENAY, W.R., Jr., HARTIG, B.C., and LOISEL, G.R., "Evaluation of Fish Populations Adjacent to Borrow Areas of Beach Nourishment Project, Hallandale (Broward County), Florida," *Ecological Evaluation of a Beach Nourishment Project at Hallandale (Broward County), Florida,* Feb. 1980.

Keywords: *Beach nourishment, Ecology, Fish, Florida–Broward County and Hallandale*

This report (Vol. I) provides the first comprehensive study of the impact of beach nourishment and offshore borrowing on nearshore and coral reef fish populations. The study assesses the fish populations within the surf zone and over the first and second reefs of Hallandale (Broward County), Florida, 7 years following dredging for a beach restoration project.

BEST DOCUMENT AVAILABLE

MR 80-1 (II) . . . . . (Vol. II)---

MARSH, G.A., et al., "Evaluation of Benthic Communities Adjacent to a Restored Beach, Hallandale (Broward County), Florida," *Ecological Evaluation of a Beach Nourishment Project at Hallandale (Broward County), Florida,* Mar. 1980.

Keywords: *Beach nourishment, Benthos, Florida–Broward County, Golden Beach, and Hallandale*

Benthic communities adjacent to a restored beach at Hallandale (Broward County), Florida were analyzed and compared to similar communities at nearby Golden Beach (Dade County). Five sand stations and four reef stations were sampled along a transect from the intertidal zone through the second reef. This study assesses the postnourishment condition of sandy bottom- and reef-dwelling communities approximately 7 years after beach nourishment and offshore dredging. The study also provides prenourishment data for an impact analysis of a fill project underway at Hallandale in September 1979.

MR 80-2 . . . . . .

BIRKEMEIER, W.A., "The Effect of Structures and Lake Level on Bluff and Shore Erosion in Berrien County, Michigan, 1970-74," Apr. 1980.

Keywords: *Berrien County, Michigan, Bluffs, Erosion, Great Lakes, Lake Michigan*

Rates of bluff recession and shoreline change along five 1.6-kilometer reaches within Berrien County, Michigan, were measured between 1970 and 1974, using aerial photos. Procedures used in analyzing the aerial photos and their accuracy are described in an Appendix. Guidance is also given for determining the number of measurement points needed per distance along the shore depending on the desired accuracy of the bluff recession rates.

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4. TECHNICAL PAPERS

TP 76-1* **A027 095**

EVERTS, C.H., and MOORE, H.E., "Shoaling Rates and Related Data from Knik Arm Near Anchorage, Alaska," Mar. 1976.

Keywords: *Bulk density, Currents, Harbors, Knik Arm, Alaska, Sediments, Shoaling rates, Tides*

This report discusses sedimentation in coastal waters characterized by high tidal ranges and large concentrations of fine suspended sediment, and the shoaling potential of waters in Knik Arm, near Anchorage, Alaska.

TP 76-2* **A025 467**

WILLIAMS, S.J., "Geomorphology, Shallow Subbottom Structure, and Sediments of the Atlantic Inner Continental Shelf off Long Island, New York," Mar. 1976.

Keywords: *Beach nourishment, Geomorphology, ICONS, Long Island, New York, Sediments, Seismic reflection*

The Atlantic Inner Continental Shelf off Long Island was surveyed for data on bottom morphology and sediments, subbottom structure, and sand deposits suitable for beach nourishment. Survey data consist of 960 miles of seismic reflection profiles and 152 vibratory cores.

TP 76-3* **A025 444**

MEISBURGER, E.P., "Geomorphology and Sediments of Western Massachusetts Bay," Apr. 1976.

Keywords: *Beach nourishment, Geomorphology, Massachusetts Bay, Massachusetts, Sediments, Seismic reflection*

A seismic reflection survey and bottom sampling were conducted in western Massachusetts Bay to obtain data on bottom topography and sediments, subbottom structure and composition, and sand deposits suitable for beach restoration and nourishment. Primary data consisted of 242 miles of seismic reflection surveys and 43 sediment cores.

TP 76-4 . . . . . **A028 344**

ALLISON, D.M., and SAVAGE, R.P., "Tests of Low-Density Marine Limestone for Use in Breakwaters," May 1976.

Keywords: *Armor units, Breakwaters, Cover layer, Marine limestone, New Bern, North Carolina*

A porous, low-density limestone (cemented shell stone) available from a quarry in New Bern, North Carolina, was tested for stability as a rubble-mound armor unit, in the large wave tank at CERC. The use of New Bern stone as a cover or underlayers of rubble-mound coastal structures is not recommended.

BEST DOCUMENT AVAILABLE

TP 76-5* **A026 223**

PAWKA, S.S., et al., "Wave Climate at Torrey Pines Beach, California," May 1976.

Keywords: *Pressure gages, Torrey Pines Beach, California, Wave gage array, Wave spectra*

Report presents a study of the wave climate at Torrey Pines Beach, California, using a line array of four pressure sensors which paralleled the coastline at a depth of 10 meters. Data from the array were used to calculate estimates of the frequency-directional spectra of the wave field.

TP 76-6* **A027 026**

LOCHER, F.A., GLOVER, J.R., and NAKATO, T., "Investigation of the Operating Characteristics of the Iowa Sediment Concentration Measuring System," May 1976.

Keywords: *Electro-optical instrument, Sand particles, Sediments, Suspended sediments*

Results of an investigation to evaluate the capabilities and limitations of the Iowa Sediment Concentration Measuring System (ISCMS) are presented. Recommendations for improvement of the ISCMS are also included.

TP 76-7* **A028 345**

CAMMEN, L.M., SENECA, E.D., and COPELAND, B.J., "Animal Colonization of Man-Initiated Salt Marshes on Dredge Spoil," June 1976.

Keywords: *Animal colonization, Coastal fauna, Dredge spoil, Erosion, Grasses, North Carolina—Drum Inlet and Snow's Cut, Salt marshes, Sediments, Spartina alterniflora*

A research study to determine differences in fauna in spoil areas and natural marsh at Drum Inlet and Snow's Cut, North Carolina, is presented. A marked difference in faunal development was found at the sites. Research also showed that planting *Spartina* on dredge spoil led to the creation of salt marsh which resembled natural marsh.

TP 76-8* **A029 000**

SOLLITT, C.K., and CROSS, R.H., III, "Wave Reflection and Transmission at Permeable Breakwaters," July 1976.

Keywords: *Breakwaters, Permeable breakwaters, Wave reflection, Wave transmission, Waves*

Results of an investigation to develop a theoretical analysis to account for wave reflection and transmission at permeable breakwaters are presented. The effectiveness of alternative breakwater configurations independent of repetitive experimental programs is compared.

BEST DOCUMENT AVAILABLE

TP 76-9* A029 637

BORGMAN, L.E., "Statistical Properties of Fast Fourier Transform Coefficients Computed from Real-Valued, Covariance-Stationary, Period Random Sequences," July 1976.

Keywords: *Computer programs, Fast Fourier transform, Spectral analysis, Wave spectra*

A systematic development of the probability properties of fast Fourier transform coefficients is presented as part of an investigation of the statistical precision of ocean wave directional spectra.

TP 76-10* A029 638

BORGMAN, L.E., "The Statistical Anatomy of Ocean Wave Spectra," July 1976.

Keywords: *Gulf of Mexico, Hurricane Carla, Hurricane waves, Spectral analysis, Wave spectra*

The statistical variations in wave energy spectral estimates for hurricane waves are examined empirically for 12 separate intervals of wave records measured during Hurricane Carla in September 1961. This report gives the analysis for Hurricane Carla and develops certain implications and consequences of the empirical results.

TP 76-11* A031 814

COLLINS, J.I., and CHESNUTT, C.B., "Grain Shape and Size Distribution Effects in Coastal Models," July 1976.

Keywords: *Grain shape, Longshore bars, Movable-bed modeling, Profiles, Sediments, Size distribution*

This study investigates the effects of model sediment-size distribution and particle shape in movable-bed models. An experimental evaluation of the scale model relationship is presented.

TP 76-12 . . . . . A029 639

HARRIS, D.L., "Wind-Generated Waves for Laboratory Studies," Aug. 1976.

Keywords: *Laboratory wave facilities, Wave tanks, Waves, Wind-generated waves*

An investigation of the potential use of a wind-wave research facility for coastal engineering studies is presented. Report reviews earlier studies of wave generation, airflow in tunnels, and early laboratory experiments with wind-wave facilities.

TP 76-13* A030 169

WEBB, J.W., and DODD, J.D., "Vegetation Establishment and Shoreline Stabilization: Galveston Bay, Texas," Aug. 1976.

Keywords: *East Bay, Texas, Fertilizers, Marsh plants, Shore protection, Shoreline stabilization, Transplanting, Vegetation*

Techniques for shoreline stabilization with vegetation and the associated environment are presented. Studies were conducted on the adaptation of species for shoreline stabilization, use of wave-stilling devices, and effects of fertilizers along the north shore of East Bay, Texas.

BEST DOCUMENT AVAILABLE

TP 76-14* **A032 115**

COX, J.L., "Sampling Variation in Sandy Beach Littoral and Nearshore Meiofauna and Macrofauna," Sept. 1976.

Keywords: *Macrofauna, Meiofauna, Monterey Bay, California, Sampling analysis, Spatial heterogeneity, Trophidynamics*

This study evaluates sampling procedures and statistical methods for analysis of the fauna associated with high-energy sandy beaches. An extensive one-season sampling at a relatively undisturbed beach site in central Monterey Bay, California, was used as a basis for the evaluation.

TP 76-15 . . . . . **A032 684**

OLIVER, J.S., and SLATTERY, P.N., "Effects of Dredging and Disposal on Some Benthos at Monterey Bay, California," Oct. 1976.

Keywords: *Benthos, Dredge spoil, Ecological systems, Environmental effects, Monterey Bay, California, Recolonization rates*

Natural temporal variations in benthic assemblages and substrate stability changes, effects of dredging and disposal of dredged material, subsequent recolonization and recovery, and faunal distribution and reproductive abilities are discussed.

TP 76-16* **A033 297**

DAVIS, R.A., Jr., "Coastal Changes, Eastern Lake Michigan, 1970-73," Oct. 1976.

Keywords: *Bluff erosion, Lake levels, Lake Michigan, Profiles, Sediments, Terrace erosion*

This study concerns erosion of the bluff or edge of the terrace marking the landward boundary of the beach at 17 sites along a 250-mile segment of the east coast of Lake Michigan.

TP 76-17 . . . . . **A032 183**

ADEE, B.H., RICHEY, E.P., and CHRISTENSEN, D.R., "Floating Breakwater Field Assessment Program, Friday Harbor, Washington," Oct. 1976.

Keywords: *Breakwaters, Floating breakwaters, Friday Harbor, Washington, Wave attenuation, Wave reflection, Wave transmission, Waves*

This study presents a theoretical model for predicting the dynamic behavior of a floating breakwater, and a report on a field experiment designed to provide basic data for verifying the model.

TP 76-18 . . . . . **A034 534**

PETRAUSKAS, C., "Hydrodynamic Damping and "Added Mass" for Flexible Offshore Platforms," Oct. 1976.

Keywords: *Added mass, Damping, Offshore platforms, Wave forces*

Dynamic responses of flexible platforms due to wind-generated waves are an important design consideration. This study presents the theoretical and experimental study of hydrodynamic damping and "added mass."

BEST DOCUMENT AVAILABLE

TP 76-19 . . . . . **A036 896**

McCARTNEY, B.L., and AHRENS, J.P., "Overlay of Large, Placed Quarrystone and Boulders to Increase Riprap Stability," Dec 1976.

Keywords: *Armor units, Boulders, Oahe Reservoir, South Dakota, Quarrystone, Riprap, Wave forces*

This report describes the wave tank tests and field performance of a single layer of large armor stone used as a protective overlay on underdesigned riprap. The resistance of the overlay to wave attack was determined by small-scale model and prototype-scale wave tank tests at CERC. Design information on a stone overlay concept used to repair a damaged riprap revetment on Oahe Reservoir, South Dakota, is also included.

TP 76-20 . . . . . **A037 377**

O'CONNOR, J.M., NEUMANN, D.A., and SHERK, J.A., Jr., "Lethal Effects of Suspended Sediments on Estuarine Fish," Dec. 1976.

Keywords: *Estuarine fish, Fish, Lethal effects, Mineral solids, Patuxent River, Maryland, Sediments, Suspended sediments*

This study provides base-line information for preproject decisionmaking based upon the anticipated concentration of suspended sediments at the project site and the effect of various lengths of exposure on estuarine fish of different life-history stages and habitat preference.

TP 77-1* **A037 378**

DeWALL, A.E., PRITCHETT, P.C., and GALVIN, C.J., Jr., "Beach Changes Caused by the Atlantic Coast Storm of 17 December 1970," Jan. 1977.

Keywords: *Beach Evaluation Program—CERC, Erosion, Cape Cod, Massachusetts, Misquamicut, Rhode Island, New Jersey—Atlantic City, Long Beach Island, and Ludlam Island, New York—Jones Beach and Westhampton Beach, Profiles, Tides, Waves*

This report describes measured beach changes at selected localities along the Atlantic coast, from North Carolina to New England, which resulted from a storm of moderate intensity on 17 December 1970. As part of the CERC Beach Evaluation Program (BEP), 91 beach profile lines at seven localities between Cape Cod, Massachusetts, and Cape May, New Jersey, were surveyed before and after the storm.

TP 77-2 . . . . . **A038 282**

SEELIG, W.N., "Stilling Well Design for Accurate Water Level Measurement," Jan. 1977.

Keywords: *Damping, Instrumentation, Stilling well, Waves*

A method is presented for the design of stilling wells based on the work by Noye (1974a, 1974b, 1974c). A step-by-step procedure is outlined, design curves are presented, and an example is given to illustrate the procedures.

BEST DOCUMENT AVAILABLE

TP 77-3 . . . . . A040 646

O'CONNOR, J.M., NEUMANN, D.A., and SHERK, J.A., Jr., "Sublethal Effects of Suspended Sediments on Estuarine Fish," Feb. 1977.

Keywords: *Estuarine ecology, Fish, Patuxent River, Maryland, Sediments*

The objective of this study was to determine the effects, if any, of sublethal concentrations of suspended materials on the fish in estuarine systems. The suspensions were of natural sediment, obtained from the Patuxent River estuary, Maryland, or commercially available fuller's earth.

TP 77-4 . . . . . A041 945

MacDONALD, T.C., "Sediment Suspension and Turbulence in an Oscillating Flume," Apr. 1977.

Keywords: *Fall velocity, Sediment suspension*

In 65 experiments with one lightweight sediment, suspended-sediment concentration was linear with elevation, except near the bottom, as found by others. In limited experiments with different fall velocities, slope of the concentration distribution becomes more negative as fall velocity increases. Root-mean-square (rms) velocity fluctuations were also measured.

TP 77-5 . . . . . A042 061

FAIRCHILD, J.C., "Suspended Sediment in the Littoral Zone at Ventnor, New Jersey, and Nags Head, North Carolina," May 1977.

Keywords: *Nags Head, North Carolina, Sediment transport, Sediments, Ventnor, New Jersey*

This study examines data on sediment suspensions in and near the surf zone at Nags Head, North Carolina, and at Ventnor, New Jersey, using a tractor-mounted pump sampler. The study was conducted to determine the characteristics of such suspensions and to judge the relative importance of sediment suspensions to the total littoral transport.

TP 77-6 . . . . . A042 748

HOBSON, R.D., "Review of Design Elements for Beach-Fill Evaluation," June 1977.

Keywords: *Beach nourishment, Sediments*

This study provides a summary and review of the following topics on beach nourishment, one engineering alternative for combating coastal erosion and for providing shore protection against storm-produced waves and flooding: (a) Analyzing and characterizing sediments, (b) sampling beaches and borrow sites, (c) calculating composite grain-size distributions, and (d) use of existing beach-fill schemes. State-of-the-art recommendations relating to these topics are also provided.

BEST DOCUMENT AVAILABLE

TP 77-7 . . . . . A044 066

ESTEVA, D.C., "Evaluation of the Computation of Wave Direction with Three-Gage Arrays," July 1977.

Keywords: *Pt. Mugu, California, Wave gage array, Wave gages*

A description of the collection and analyses of data obtained with an array of five pressure sensors near Pt. Mugu, California, is presented. The 10 three-gage arrays possible with five gages are used to compare redundant values of the direction of wave propagations. The dependence of directional determination on array orientation relative to incident wave direction and wavelength at the array site is revealed by calculations based on simulated narrow-banded wave trains.

TP 77-8 . . . . . A044 074

SEELIG, W.N., and SORENSEN, R.M., "Hydraulics of Great Lakes Inlets," July 1977.

Keywords: *Great Lakes, Inlets, Pentwater Harbor, Michigan, Seiching*

Field measurements were conducted in 1974-75 at nine harbors on the Great Lakes to investigate the nature of long wave excitation and the generating mechanism for significant inlet velocities, establish techniques for predicting inlet-bay system response, and develop base data for future planning and design studies. Examples to demonstrate use of the concepts and techniques developed in the study are applied to the design of a new inlet channel and to the modification of an existing channel.

TP 77-9* A047 362

HALLERMEIER, R.J., "Calculating a Yearly Limit Depth to the Active Beach Profile," Sept. 1977.

Keywords: *Profiles, Sediment transport, Wave climate*

A sediment entrainment parameter is used to calculate the maximum water depth for intense agitation of a sand bed by shoaling waves with given height and period. Calculated depths agree with measured water depths over a terrace cut into a fine sand slope by constant laboratory waves. For high wave conditions expected 12 hours per year on exposed U.S. coasts, the calculated depth is about twice the wave height.

TP 77-10 . . . . . A047 608

DeWALL, A.E., "Littoral Environment Observations and Beach Changes Along the Southeast Florida Coast," Oct. 1977.

Keywords: *Beach Evaluation Program—CERC, Currents, Florida—Boaca Raton, Hollywood, and Jupiter, LEO, Profiles, Wave climate, Waves*

This report presents an analysis of a series of beach profile surveys and littoral environment observations collected during a 4 1/2-year study at three sites on the southeast Florida coast.

BEST DOCUMENT AVAILABLE

TP 77-11 . . . . . A046 551

BOWIE, G.L., "Forces Exerted by Waves on a Pipeline At or Near the Ocean Bottom," Oct. 1977.

Keywords: *Drag forces, Lift forces, Pipelines, Wave forces*

This report presents an analysis of wave-induced forces on a submarine pipeline near the ocean floor. The wave-induced forces consist of several components–inertial forces, drag forces, lift forces, and under some conditions, eddy-induced forces.

TP 77-12 . . . . . A048 747

CAMFIELD, F.E., "Wind-Wave Propagation Over Flooded, Vegetated Land," Oct. 1977.

Keywords: *Wave generation, Waves*

Report describes a method for estimating wind-wave growth and decay over flooded areas where there is a major friction effect because of dense vegetation. These technical guidelines are an extension of the procedures given in the Shore Protection Manual (SPM) which limits the design curves to waves passing over a sandy bottom.

TP 77-13 . . . . . A049 977

REID, R.O., VASTANO, A.C., and REID, T.J., "Development of Surge II Program With Application to the Sabine-Calcasieu Area for Hurricane Carla and Design Hurricanes," Nov. 1977.

Keywords: *Computer programs, Hurricane Carla, Hurricane surge, Mathematical models, Storm surge, SURGE II computer program*

SURGE II is a program for calculation of storm surges and tides in a bay or estuary of the type where frictional resistance dominates over Coriolis force. It includes the provision for subgrid scale barriers and channels as well as allowing for overtopping of barriers and flooding of and recession from normally dry regions adjoining the bay or estuary. The theory and numerical algorithm is discussed in detail. A user's guide for the program is also provided. Application of the program, in respect to astronomical tides and hurricane surges, is made for the Sabine-Calcasieu region which straddles the Texas and Louisiana boundary.

TP 78-1 . . . . . A055 409

HALLERMEIER, R.J., and RAY, R.E., "Wave Transformation at Isolated Vertical Piles in Shallow Water," Mar. 1978.

Keywords: *Piles, Wave forces, Wave runup, Wave transformation*

This report presents the results of a laboratory investigation of wave height measurements at an isolated pile. The investigation was motivated by the possibility that wave transformation near a pile can be used to measure nearshore wave directions. The tests were conducted in relatively shallow water with relatively steep waves; the test piles have small cross sections compared to wavelength.

BEST DOCUMENT AVAILABLE

TP 78-2 . . . . . **A055 562**

STOA, P.N., "Reanalysis of Wave Runup on Structures and Beaches," Mar. 1978.

Keywords: *Armor units, Quarrystone, Wave runup*

Published and unpublished results of tests of monochromatic wave runup were reanalyzed for both smooth and rough structure surfaces. The rough-surfaced structures included breakwaters and riprapped slopes, and both quarrystone and concrete armor units. Wave runup theory is discussed briefly and an empirical equation is given for runup on smooth slopes from waves which break on the structure slope. Example problems and methods of data analysis, together with general observations, are given.

TP 78-3 . . . . . **A056 198**

GILES, M.L., and SORENSEN, R.M., "Prototype Scale Mooring Load and Transmission Tests for a Floating Tire Breakwater," Apr. 1978.

Keywords: *Breakwaters, Floating breakwaters, Mooring forces, Tires, Wave attenuation, Wave transmission*

Prototype scale tests of the mooring load and wave transmission characteristics of a floating tire breakwater were conducted in the large wave tank at the Coastal Engineering Research Center. Standard Goodyear Tire and Rubber Co. 18-tire modules connected to form breakwaters, 4 and 6 modules (8.5 and 12.8 meters, 28 and 42 feet) wide in the direction of wave advance, were tested in water depths of 2 and 4 meters (6.56 and 13.12 feet). Monochromatic waves with a 2.64- to 8.25-second period range and heights up to 1.4 meters (4.6 feet) were used in the tests.

TP 78-4 . . . . . **A055 876**

EVERTS, C.H., "Geometry of Profiles Across Inner Continental Shelves of the Atlantic and Gulf Coast of the United States," Apr. 1978.

Keywords: *Atlantic coast, Beach Evaluation Program–CERC, Gulf coast, Inner Continental Shelf, Profiles*

Along most of the U.S. east and gulf coasts, bottom profiles extending over the Inner Continental Shelves normal from the coast display a characteristic two-sector shape. Near the coast, the *shoreface* profile sector is steep and concave-up; the seaward *ramp* sector is planar with a gradual slope away from the coast. As part of the Beach Evaluation Program (BEP) at the Coastal Engineering Research Center, 9 profiles extending from the coast 30.5 kilometers (19 miles) seaward at each of 49 localities were averaged to mathematically characterize the profiles and to develop and test criteria for discriminating among groups of profiles. Localities were selected along straight coastal reaches away from inlets and estuaries in areas where the bottom consisted of unconsolidated sediments.

BEST DOCUMENT AVAILABLE

TP 78-5 . . . . . **A060 907**

LOFQUIST, K.E.B., "Sand Ripple Growth in an Oscillatory-Flow Water Tunnel," Aug. 1978.

Keywords: *Bed forms, Profiles, Quartz sand, Ripples, Sand ripples*

The development of sand ripples in an oscillatory-flow water tunnel was observed in 104 laboratory experiments approximating conditions at the seabed under steady progressive surface waves. The period, T, and amplitude, a, of the water motion were varied over wide ranges. Three quartz sands were used, with mean grain diameters, D = 0.55, 0.12, and 0.18 millimeter. In 24 experiments, with the bed initially leveled, T was reduced until ripples appeared, and their development to final equilibrium form was observed without further change in T. The remaining 80 experiments investigated the response of previously established bed forms to changes in T or a or both.

TP 79-1 . . . . . **A072 524**

GALVIN, C.J., "Relation Between Immersed Weight and Volume Rates of Longshore Transport," May 1979.

Keywords: *Longshore energy flux, Sediment transport*

As presently used, the immersed weight rate, I_ℓ, is the volume rate, Q, of longshore transport, multiplied by a constant. For use in engineering problems, I_ℓ must be converted back to the equivalent Q. The I_ℓ formulation may be important where the unit weight of sand differs significantly from the unit weight of sand at the open-coast sites contributing data to the design curve. This report is published to show the relation between two versions of the energy flux method of predicting longshore transport: The volume rate prediction recommended in the *Shore Protection Manual* (SPM) (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977), and the immersed weight rate prediciton proposed in other publications.

TP 79-2 . . . . . **A074 022**

FIELD, M.E., "Sediments, Shallow Subbottom Structure, and Sand Resources of the Inner Continental Shelf, Central Delmarva Peninsula," June 1979.

Keywords: *Delmarva Peninsula, Geomorphology, ICONS, Inner Continental Shelf, Sediments, Seismic reflection*

A data base consisting of high-resolution seismic reflection, bathymetric, and side-scan sonar profilings was obtained in 1970 and 1974, along with vibratory cores and onshore borings. These data were analyzed to assess the resource potential of sand suitable for use in beach restoration and to establish the Quaternary evolutionary framework of the northern Delmarva inner shelf.

BEST DOCUMENT AVAILABLE

TP 79-3 . . . . . **A076 974**

MEISBURGER, E.P., "Reconnaissance Geology of the Inner Continental Shelf, Cape Fear Region, North Carolina," Sept. 1979.

Keywords: *Beach nourishment, Cape Fear, North Carolina, ICONS, Inner Continental Shelf, Sediments*

The Inner Continental Shelf off the North Carolina coast between the South Carolina border and Cape Lookout, North Carolina, was surveyed to obtain information on bottom and subbottom sediment deposits and structures. The location and the extent of deposits of sand suitable for restoration and nourishment of nearby beaches were investigated.

TP 79-4 . . . . . **A081 863**

HANDS, E.B., "Changes in Rates of Shore Retreat, Lake Michigan, 1967-76," Dec. 1979.

Keywords: *Great Lakes, Lake levels, Lake Michigan, Profiles, Submergence*

This report provides information on rates of shoreline recession and on changes in these rates during recent high water levels on the Great Lakes. A graphic summary of field data is presented to estimate effects of future lake level changes in similar coastal environments. Qualitative guidance is provided on how and when these estimates should be adjusted to reflect differences in environmental settings.

TP 80-1 . . . . . **A084 186**

SCHWARTZ, R.K., and MUSIALOWSKI, F.R., "Transport of Dredged Sediment Placed in the Nearshore Zone—*Currituck* Sand-Bypass Study (Phase I)," Feb. 1980.

Keywords: *Beach nourishment, New River Inlet, North Carolina, Sand bypassing, Sediment transport*

During 1976, 26,750 cubic meters of relatively coarse sediment was dredged from New River Inlet, North Carolina, moved downcoast by a split-hull barge, the *Currituck*, and placed in a 215-meter coastal reach between the 2- and 4-meter depth contours. Bathymetric changes on the disposal piles and in the adjacent beach and nearshore area were studied to determine the modification of the surrounding beach and nearshore profile, and the net transport direction of the disposal sediment.

TP 80-2 . . . . . **A083 239**

THOMPSON, E.F., "Energy Spectra in Shallow U.S. Coastal Waters," Feb. 1980.

Keywords: *Energy spectra, Spectral analysis, Wave gages, Waves*

This report provides coastal engineers and researchers with wave energy spectra and spectral parameters for nine shallow-water gage locations along the U.S. Atlantic, Pacific, gulf, and Great Lakes coasts (Atlantic City, Virginia Beach, Nags Head, Lake Worth, Naples, Pt. Mugu, Huntington Beach, Presque Isle, and Michigan City). Insight is also provided on the physical meaning of shallow-water spectra, which are becoming increasingly important in coastal engineering work.

BEST DOCUMENT AVAILABLE

TP 80-3 . . . . . .

SEELIG, W.N., and AHRENS, J.P., "Estimating Nearshore Conditions for Irregular Waves," June 1980.

Keywords: *Wave heights, Wave refraction*

Methods for estimating nearshore irregular wave conditions for continuously shallowing bottom contours, given the bottom slope and offshore wave characteristics, are presented. A sensitivity analysis is performed to show the influence of various input parameters on predicted nearshore significant wave height. The methods are applied to the nearshore region at CERC's Field Research Facility, Duck, North Carolina; results are compared to observed nearshore wave height changes measured at the facility.

TP 80-4 . . . . . .

GALVIN, C., and SCHWEPPE, C.R., "The SPM Energy Flux Method for Predicting Longshore Transport Rate," June 1980.

Keywords: *Longshore energy flux, Sediment transport, Wave heights*

This report explains in detail the energy flux method in Section 4.532 of the *Shore Protection Manual* (SPM). Appendix A describes the derivation of four energy flux factors. Appendix B explains how the significant wave height enters these equations. Appendix C identifies the data that led to the prediction of longshore transport rate from the energy flux factor. The importance of the correct formulation of breaker speed, and its effect on estimates of breaker angle are demonstrated. The report describes the steps used to arrive at the energy flux method, but it does not critically analyze those steps.

BEST DOCUMENT AVAILABLE

5. COASTAL ENGINEERING TECHNICAL AIDS

CDM 76-1* **A027 098**

SEELIG, W.N., "A Simplified Method for Determining Vertical Breakwater Crest Elevation Considering Wave Height Transmitted by Overtopping," May 1976.

Keywords: *Breakwaters, Wave overtopping, Wave transmission*

A method is presented for the design of vertical-faced breakwaters for wave transmission by overtopping based on laboratory experiments of Goda, Takeda, and Moriya (1967) and Goda (1969). A step-by-step procedure is outlined, design curves are presented, and examples worked to illustrate the procedure.

CETA 77-1 . . . . . **A046 822**

SEELIG, W.N., "A Simple Computer Model for Evaluating Coastal Inlet Hydraulics," July 1977.

Keywords: *Computer programs, Mathematical models, Tidal inlets*

A computer program for the prediction of coastal inlet velocities, discharge, and bay level fluctuations is presented. Two examples are given to demonstrate the numerical model. The computer documentation is included as an appendix.

CETA 77-2 . . . . . **A044 107**

AHRENS, J., "Prediction of Irregular Wave Runup," July 1977.

Keywords: *Irregular wave runup, Wave runup, Waves*

A technique is described for estimating the runup distribution of wind-generated waves, extending the method of runup prediction for waves of constant height and period presented in the Shore Protection Manual (SPM). A method of correcting runup for slope roughness and porosity, which is easier to apply than the SPM method, is also presented.

CETA 77-3 . . . . . **A046 547**

KNUTSON, P.L., "Planting Guidelines for Marsh Development and Bank Stabilization," Aug. 1977.

Keywords: *Fertilization, Marsh plants, Vegetation*

Marsh plants are effective in stabilizing eroding banks in many sheltered coastal areas. This report provides guidelines for (a) selecting plants and planting methods, (b) determining seed application rate and plant spacing, (c) determining fertilization requirements, and (d) estimating labor cost.

BEST DOCUMENT AVAILABLE

CETA 77-4 . . . . . **A046 170**

KNUTSON, P.L., "Planting Guidelines for Dune Creation and Stabilization," Sept. 1977.

Keywords: *Beach grass, Fertilization, Vegetation*

Beach grasses have been used successfully in many coastal projects to form and stabilize dune systems as natural barriers to the inland penetration of waves and storm surges. This report provides guidelines for (a) selecting plants and planting methods; (b) obtaining plants; (c) storing, planting, and maintaining plants; and (d) estimating labor requirements.

CETA 77-5 . . . . . **A047 358**

LESNIK, J.R., "Wave Setup on a Sloping Beach," Sept. 1977.

Keywords: *Wave setup, Waves*

This report combines the material previously presented in Sections 2.62 and 3.85 of the Shore Protection Manual (SPM). Computation of wave setup on beaches as steep as 1 on 10 (m = 0.01) can be easily determined by graphical means when incident wave conditions are defined. Practical applications are discussed and two example problems are provided.

CETA 77-6 . . . . . **A047 828**

CAMFIELD, F.E., "A Method for Estimating Wind-Wave Growth and Decay in Shallow Water with High Values of Bottom Friction," Oct. 1977.

Keywords: *Vegetation, Wave attenuation, Wave generation, Waves, Wind*

Report describes a method for estimating wind-wave growth and decay over flooded areas where there is a major friction effect because of dense vegetation. These technical guidelines are an extension of the procedures given in the Shore Protection Manual (SPM) which limits the design curves to waves passing over a sandy bottom.

CETA 77-7 . . . . . **A049 880**

AHRENS, J., "Prediction of Irregular Wave Overtopping," Dec. 1977.

Keywords: *Irregular waves, Wave overtopping, Wave runup, Waves*

A proposed technique is described for predicting overtopping rates for structures exposed to irregular wind-generated waves by extending the method of predicting overtopping for waves of constant height and period presented in the Shore Protection Manual (SPM).

CETA 77-8* **A049 881**

SORENSEN, R.M., "Procedures for Preliminary Analysis of Tidal Inlet Hydraulics and Stability," Dec. 1977.

Keywords: *Currents, Tidal inlets, Tidal prisms*

This report summarizes procedures for calculating the maximum tidal inlet channel velocity during a tidal cycle as well as the bay tidal range and phase lag (published by King, 1974). Guidance for the application of these procedures to solve tidal inlet design problems for jettied inlets is also presented.

BEST DOCUMENT AVAILABLE

CETA 78-1 . . . . . **A053 173**

CAMFIELD, F.E., "Acceleration and Impact of Structures Moved by Tsunamis or Flash Floods," Feb. 1978.

Keywords: *Flash floods, Impact forces, Tsunamis*

Techniques are given for determining the velocity of a structure moved by a tsunami or flash flood and impact forces with another structure. Solutions can be obtained for velocity and impact force as a function of the initial distance between the structures and the velocity of the surging water.

CETA 78-2 . . . . . **A058 407**

STOA, P.N., "Revised Wave Runup Curves for Smooth Slopes," July 1978.

Keywords: *Wave runup*

Results of previous tests of monochromatic wave runup on smooth structure slopes were reanalyzed. The runup results for both breaking and nonbreaking waves are presented in a set of curves similar to but revised from those in the *Shore Protection Manual* (SPM) (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977). The curves are for structure slopes fronted by horizontal and 1 on 10 bottom slopes. The range of values of d_s'/H_o' was extended to $d_s/H_o' = 8$; relative depth (d_s/H_o') is important even for $d_s/H_o' > 3$ for waves which do not break on the structure slope. A flow chart is given to assist in choosing the proper figure and interpreting the results when applied to untested bottom slopes (i.e., bottom slopes flatter than 1 on 10). Also given are example problems and a curve for scale-effect corrections.

CETA 79-1 . . . . . **A073 354**

STOA, P.N., "Wave Runup on Rough Slopes," July 1979.

Keywords: *Wave runup*

This report presents a method of estimating wave runup on coastal structures with rough surfaces, and is a companion report to CETA 78-2. The report is based principally on analyses of laboratory experiments as discussed in TP 78-2.

CETA 79-2 . . . . . **A072 469**

WEGGEL, J.R., "A Method for Estimating Long-Term Erosion Rates From a Long-Term Rise in Water Level," May 1979.

Keywords: *Erosion rates, Profiles, Sediment transport*

This report presents a method for estimating long-term erosion rates resulting from a rise in sea level, based on Bruun's (1962) method with an exponential curve fitted to the offshore beach profile. The method is approximate and is intended to supplement conventional analyses of historical profile and shoreline changes rather than to supplant such analyses.

BEST DOCUMENT AVAILABLE

CETA 79-3 . . . . . **A077 070**

HURME, A.K., YANCEY, R.M., and PULLEN, E.J., "Sampling Macroinvertebrates on High-Energy Sand Beaches," Sept. 1979.

Keywords: *Macroinvertebrates, Sampling analysis*

Report summarizes the most practical and cost-effective techniques developed from CERC-sponsored research and the literature for quantitatively sampling high-energy sand beach macroinvertebrates. The general habitat, the field crew's qualifications and duties, and the materials and equipment are described. A general approach to planning the fieldwork, timing the trips, and developing a sampling plan is given. Methods for taking, transferring, and preserving samples for laboratory analysis are described. Sample treatment, population analysis, cost and manpower requirements are discussed.

CETA 79-4 . . . . . **A077 905**

GILES, M.L., and ECKERT, J.W., "Determination of Mooring Load and Transmitted Wave Height for a Floating Tire Breakwater," Sept. 1979.

Keywords: *Breakwaters, Floating breakwaters, Mooring forces, Wave heights, Wave transmission*

Methods are presented for predicting the transmitted wave height, as well as for determining the anchor loading for the Goodyear module floating tire breakwater (FTB). These methods are based on laboratory tests that used full-scale monochromatic wave conditions typical of partially sheltered bodies of water. Design curves and procedures are presented for determining the breakwater width required to obtain a desired degree of wave attenuation, and for determining the mooring loads for each anchor line. Various anchor types are discussed to aid in the design of an anchor system.

CETA 79-5 . . . . . **A077 906**

SEELIG, W.N., "Estimating Nearshore Significant Wave Height for Irregular Waves," Oct. 1979.

Keywords: *Computer programs, Irregular waves, Mathematical models*

Design curves for predicting nearshore significant wave height for irregular wave conditions, given deepwater wave conditions and the nearshore bottom slope, are presented. Examples of the curves used are given. The design curves were developed using the analytical model of Goda (1975).

CETA 79-6 . . . . . **A079 801**

SEELIG, W.N., "Estimation of Wave Transmission Coefficients for Permeable Breakwaters," Oct. 1979.

Keywords: *Permeable breakwaters, Transmission coefficient, Wave transmission*

Report describes a method for predicting wave transmission coefficients for permeable breakwaters using a transmission by overtopping equation together with an analytical model. This technique has been tested with physical model results for nonbreaking and some breaking waves, for monochromatic and irregular wave conditions, and for riprap and some concrete armor unit breakwaters. The technique was found to give useful predicitions of transmission coefficients for design.

BEST DOCUMENT AVAILABLE

CETA 79-7 . . . . . A080 983

HOBSON, R.D., "Definition and Use of the Phi Grade Scale," Nov. 1979.

Keywords: *Grain-size distribution, Phi grade scale, Sediment texture*

This report describes the phi grade scale and how it can be used to classify and analyze sediment texture.

CETA 80-1 . . . . . A084 222

SEELIG, W.N., "Maximum Wave Heights and Critical Water Depths for Irregular Waves in the Surf Zone," Feb. 1980.

Keywords: *Irregular waves, Wave heights, Waves*

The nearshore irregular wave deformation model of Goda (1975) is used to develop prediction curves for the magnitude and location of peak wave heights in the surf zone as a function of profile slope and offshore wave steepness. An example that demonstrates the use of these curves is presented.

CETA 80-2 . . . . . .

PHILLIPS, R.C., "Planting Guidelines for Seagrasses," Feb. 1980.

Keywords: *Erosion, Grasses, Vegetation*

An intensive review was made of the historical and present work on transplanting seagrasses, including eelgrass, turtle grass, shoalgrass, manatee grass, and ditch grass. The best seasons, recommended methods of transplanting, and propagules to use for each species are listed for the U.S. coasts. Some of the more important environmental parameters which directly influence successful transplanting are reviewed.

CETA 80-3 . . . . . A085 526

WALTON, T.L., Jr., "Computation of Longshore Energy Flux Using LEO Current Observations," Mar. 1980.

Keywords: *Currents, LEO, Longshore energy flux*

A computational technique is presented for the longshore energy flux factor, P_{ls}, using current observations from the Littoral Environment Observation (LEO) program. Chapter 4 of the *Shore Protection Manual* (SPM) gives various equations for P_{ls} as a function of wave height, wave period, and breaking wave angle. The present report details how P_{ls} can be calculated using longshore current and breaking wave height data only.

CETA 80-4 . . . . . .

PRINS, D.A., "Data Collection Methods for Sand Inventory-Type Surveys," Mar. 1980.

Keywords: *Continental Shelf, Data collection Sand inventory, Sediments*

Shallow areas of the Continental Shelf have been found to be a potential source of suitable sand for beach fill. This report describes the techniques and methods used in planning and implementation of the data collection effort to locate and delineate this source.

BEST DOCUMENT AVAILABLE

CETA 80-5 . . . . . (in preparation)

CETA 80-6 . . . . . .

VITALE, P., "A Guide for Estimating Longshore Transport Rate Using Four SPM Methods," Apr. 1980.

Keywords: *Coastal engineering, Sediment transport*

This report is a guide for computing longshore transport rate. Step-by-step procedures are presented as a guide through an analysis of the available data to the appropriate choice of one or more of the four *Shore Protection Manual* (SPM) methods of estimating the longshore transport rate. Each of the four methods is explained with appropriate references or examples.

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6. SPECIAL REPORTS

SR 1 . . . . . **(Vol. I)---GPO Stock No. 008-022-00083-6**
(Vol. II)---GPO Stock No. 008-022-00084-6

DEAN, R.G., "Presentation of Research Results," Vol. I, "Tabulation of Dimensionless Stream Function Theory Variables," Vol. II, *Evaluation and Development of Water Wave Theories for Engineering Application*, Nov. 1974.

Keywords: *Stream-function wave theory, Waves*

This research report and the large set of tables represent the most up-to-date and most accurate method available to coastal engineers to determine wave characteristics for design purposes. The report and tables can be used in the design of structures vulnerable to wave action, including shore protection structures, offshore oil platforms, and offshore harbors.

Volume I describes: (a) an evaluation of the degree to which various available wave theories satisfy the nonlinear water-wave mathematical formulation, and (b) a comparison of water particle velocities measured in the laboratory with those predicted by a number of available wave theories. The results indicated that Dean's stream-function wave theory provided generally better agreement with both the mathematical formulation and the laboratory data. Volume I also includes a number of examples illustrating the application of the wave tables (described below to offshore design problems).

Based on the evaluation phase described above, a set of wave tables was developed and is presented as Volume II. The tables consist of dimensionless quantities which describe the kinematic and dynamic fields of a two-dimensional progressive water wave. In addition, quantities are included which are directly applicable to frequently required design calculations and also parameters which should be of interest to the researcher and scientist.

SR 2* . . . . . **GPO Stock No. 008-022-00091-7**

DUNHAM, J.W., and FINN, A.A., "Small-Craft Harbors: Design, Construction, and Operation," Dec. 1974.

Keywords: *Docks, Harbors, Marinas, Piers*

This report presents analytical data and design standards and procedures for use in the development of small-craft harbors and launching facilities under a wide variety of conditions applicable to a broad spectrum of geographic locations. Environmental impact and governmental control aspects are discussed. Procedures for determining project feasibility and possible sources of governmental assistance are presented. Harbor operations and administration are reviewed. Several case histories of harbors are included.

BEST DOCUMENT AVAILABLE

SR 3 . . . . . **GPO Stock No. 008-022-00124-7**

WOODHOUSE, W.W., Jr., "Dune Building and Stabilization with Vegetation," Sept. 1978.

Keywords: *Dune building, Dune stabilization, Dunes, Fertilization, Sand fences, Vegetation*

This is the first comprehensive report on dune building and stabilization in the United States. The practical information on methods and dune plants is the result of more than 20 years of experimentation in coastal areas from the mouth of the Columbia River in Oregon through southern California and the Gulf of Mexico to Cape Cod, Massachusetts. The use of fences and vegetation for dune creation is discussed, and the labor and material requirements for dune creation and sand stabilization projects are summarized. The major plants suitable for dune building, their propagation and planting requirements, and the stabilization of dunes by various means such as matting, fences, and vegetation, are given for the major coastal regions of the contiguous United States. The techniques discussed are now applicable to these coastal regions.

SR 4 . . . . . **GPO Stock No. 008-022-00133-6**

WOODHOUSE, W.W., Jr., "Building Salt Marshes Along the Coasts of the Continental United States," May 1979.

Keywords: *Fertilization, Marsh vegetation, Salt marshes*

This is the first comprehensive report on coastal marsh creation in the United States. It provides potential users an analysis and interpretation of the available information on this subject. The role of marshes, the feasibility of marsh creation, and the effects of elevation, salinity, slope, exposure, and soils on marsh establishment are discussed. Plants suitable for marsh building are described by the major regions.

SR 5 . . . . . **GPO Stock No. 008-022-00141-7**

HUDSON, R.Y., et al., "Coastal Hydraulic Models," May 1979.

Keywords: *Hydraulic models, Movable-bed modeling*

This comprehensive report describes the use of hydraulic models to assist in the solution of complex coastal engineering problems. The report provides information for use by both the laboratory research engineer and the field design engineer on the capabilities and limitations of coastal hydraulic modeling procedures.

SR 6 . . . . . **GPO Stock No. 008-022-00145-0**

CAMFIELD, F.E., "Tsunami Engineering," Feb. 1980.

Keywords: *Mathematical models, Tsunamis, Wave forces, Waves*

This report provides a source of state-of-the-art information on tsunami engineering. The report summarizes available information, identifies gaps in existing knowledge, and discusses methods of predicting tsunami flooding. The generating mechanisms of tsunamis and the method of determining the probability of occurrence are given. The report discusses tsunami-structure interaction and illustrates various types of damage caused by tsunamis.

BEST DOCUMENT AVAILABLE

7. GENERAL INVESTIGATION OF TIDAL INLETS

GITI 1 . . . . . (in preparation)

GITI 2* A012 798

BARWIS, J.H., "Catalog of Tidal Inlet Aerial Photography," June 1975.

Keywords: *Catalogs, Tidal inlets*

Data on approximately 6,000 aerial photographic coverages of tidal inlets are presented in tabular form, along with information on how any given photo may be obtained. The compilation covers inlets along the Atlantic, gulf, and Pacific coasts of the contiguous U.S. coastline from 1938 to 1974. Information is also given on sources of additional photography, and on obtaining photography of beach areas between any two inlets.

GITI 3* A022 327

JARRETT, J.T., "Tidal Prism-Inlet Area Relationships," Feb. 1976.

Keywords: *Tidal inlets, Tidal prisms*

The tidal prism-inlet area relationships for inlets on sandy coast established by M.P. O'Brien were reanalyzed using his data and data published by other investigators. In addition, tidal prism and inlet cross-sectional area data developed in the Inlet Classification Study, a subfeature of the Corps of Engineers General Investigation of Tidal Inlets, were also used. These data result in a total of 162 data points for 108 inlets—59 of which are located on the Atlantic coast, 24 on the gulf coast, and 25 on the Pacific coast of the United States. The data are grouped into three main categories, namely (a) all inlets, (b) unjettied and single-jettied inlets, and (c) inlets with two jetties.

GITI 4* A020 355

BARWIS, J.H., "Annotated Bibliography on the Geologic, Hydraulic, and Engineering Aspects of Tidal Inlets," Jan. 1976.

Keywords: *Bibliographies, Tidal inlets*

Abstracts and annotations are given for about 1,000 published and unpublished reports, dated 1973 and earlier, on the geologic and engineering aspects of tidal inlets. Insofar as they relate to inlets, references are given on tidal hydraulics, engineering structures, littoral processes, stratigraphy and geologic history, coastal aerial photography, and Corps of Engineers reports of investigation of individual inlets.

GITI 5 . . . . . A022 328

O'BRIEN, M.P., "Notes on Tidal Inlets on Sandy Shores," Feb. 1976.

Keywords: *Tidal hydraulics, Tidal inlets*

This report presents observations, theories, and analysis that the author has found applicable to the rational design of coastal inlets. It also presents various memorandums on the behavior and sedimentary and hydraulic characteristics of tidal inlets on sandy shorelines, and is intended to represent a source of ideas for graduate thesis studies, as well as a stimulant to other research workers in this field.

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GITI 6 . . . . . A052 795

HARRIS, D.L., and BODINE, B.R., "Comparison of Numerical and Physical Hydraulic Models, Masonboro Inlet, North Carolina," June 1977.

Keywords: *Computer programs, Hydraulic models, Masonboro Inlet, North Carolina, Mathematical models, Tidal inlets*

Four models of Masonboro Inlet, North Carolina, have been developed in a program for assessing the value of models in investigating coastal inlet hydraulics problems. A distorted scale, fixed-bed physical model, a lumped parameter numerical model, and two two-dimensional numerical models were included in the study. The report presents equations which govern the mean flow in incompressible, nearly homogeneous fluid layers along with the physical interpretation of each term. Discussed in this report are general considerations for modeling tidal flows and their application to distorted scale physical models with particular reference to the Masonboro Inlet model. General features of numerical models and their application to two-dimensional hydrodynamic models such as the Masonboro Inlet models are also discussed. This report has four appendixes, published as four separate reports.

GITI 6 (App. 1) A052 796

SAGER, R.A., and SEABERGH, W.C., "Comparison of Numerical and Physical Hydraulic Models, Masonboro Inlet, North Carolina; Appendix 1: Fixed-Bed Hydraulic Model Results," June 1977.

Keywords: *Computer programs, Hydraulic models, Masonboro Inlet, North Carolina, Mathematical models, Tidal inlets*

This appendix discusses the verification, base tests, and predictive test of a fixed-bed hydraulic model of Masonboro Inlet, North Carolina, as part of the evaluation of the state-of-the-art inlet modeling techniques. It presents the data necessary for a comparison of results of the physical and numerical models discussed in the basic report and in the following appendixes.

GITI 6 (App. 2) . . . . . (Vol. 1)---A052 797
. . . . . (Vol. 2)---A052 798

MASCH, F.D., BRANDES, R.J., and REAGAN, J.D., "Comparison of Numerical and Physical Hydraulic Models, Masonboro Inlet, North Carolina; Appendix 2. Numerical Simulation of Hydrodynamics (WRE)," June 1977.

Keywords: *Computer programs, Hydraulic models, Masonboro Inlet, North Carolina, Mathematical models, Tidal inlets*

This study was initiated to help evaluate the degree to which mathematical models can be used to predict quantitatively the hydrodynamics of flow through tidal inlets (exclusive of sediment transport). For this purpose, HYDTID, a two-dimensional finite-difference computational model, was applied to Masonboro Inlet, HYDTID, with its genesis in the hurricane surge model of Reid and Bodine (1968), was formulated and programed as a basic part of a comprehensive study for the development of estuarine transport models (Masch, et al., 1969 and Masch and Brandes, 1971), and has

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been developed to its present form through a series of application-improvement efforts. The modeling capabilities in HYDTID are described and details of the basic equations, boundary conditions, numerical solution scheme and programing techniques are presented. This is followed by the application of HYDTID together with a discussion of the requirements imposed by Masonboro Inlet. This appendix is published in two volumes.

GITI 6 (App. 3) **A052 799**

CHEN, R.J., and HEMBREE, L.A., Jr., "Comparison of Numerical and Physical Hydraulic Models, Masonboro Inlet, North Carolina; Appendix 3, Numerical Simulation of Hydrodynamics (Tracor)," June 1977.

Keywords: *Computer programs, Hydraulic models, Masonboro Inlet, North Carolina, Mathematical models, Tidal inlets*

The objective of this study was the adaptation of Tracor's two-dimensional hydraulic model to Masonboro Inlet, North Carolina, in order to predict the water surface time history and current velocities from Masonboro Inlet for two hydrographic conditions. The project consisted of three main phases: (a) Adaptation of Tracor's model to Masonboro Inlet, (b) adjustment of the model to allow reproduction of the prototype tides and currents of 12 September 1969, and (c) prediction of tides and currents for the additional hydrographic conditions of the inlet for November 1964 and June 1967 using idealized mean and spring tides in the ocean.

GITI 6 (App. 4) **A052 800**

HUVAL, C.J., and WINTERGERST, G.L., "Comparison of Numerical and Physical Hydraulic Models, Masonboro Inlet, North Carolina; Appendix 4, Simplified Numerical (Lumped Parameter) Simulation," June 1977.

Keywords: *Computer programs, Hydraulic models, Masonboro Inlet, North Carolina, Mathematical models, Tidal inlets*

This study is concerned with the implementation and application of a hydraulic mathematical model for predicting ocean tide-induced current velocities within a coastal inlet and the water level fluctuation in an adjoining embayment. The mathematical model used in this study, referred to as the lumped parameter approach, is based on an extension of the method developed by Keulegan (1967). The numerical system described in this study is composed of three computer programs, each performing a separate function. One program generates a set of tables to give generalized inlet hydraulics for some variable basin surface areas. A second program (INLET) gives serial calculations of the inlet flow and the basin variations. The third program (SECPLT) plots the ocean tide, basin tidal response inlet velocity and inlet flow, and computes inlet cross-sectional areas from digitized hydrographic data.

The objective of this study is to apply the lumped parameter model to Masonboro Inlet and determine the tidal response of the system of inner-connecting channels and velocities arising from a given ocean tide.

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GITI 7 . . . . . **A026 699**

McNAIR, E.C., "Model Materials Evaluation; Sand Tests; Hydraulic Laboratory Investigation," June 1976.

Keywords: *Hydraulic models, Movable-bed modeling, Quartz sand, Sediment transport, Tidal inlets*

A laboratory investigation was performed to define responses of a natural quartz sand to various hydraulic conditions. The results demonstrate the performance of the material in a movable-bed model and, when compared with the responses of other materials, may provide a basis for the selection of optimum materials for various movable-bed modeling requirements.

GITI 8 . . . . . **A038 472**

BEHRENS, E.W., WATSON, R.L., and MASON, C., "Hydraulics and Dynamics of New Corpus Christi Pass, Texas: A Case History, 1972-73," Jan. 1977.

Keywords: *Corpus Christi Pass, Texas, Sediment transport, Tidal discharge, Tidal hydraulics, Tidal inlets*

A case history of the hydraulics and sedimentation of the Corpus Christi Water Exchange Pass, Texas, from 1972-73 is presented. Qualitative data are given on longshore sediment transport, tidal differentials, flood and ebb tidal discharge, wind waves, and local winds to explain bathymetric changes in the Pass.

GITI 9 . . . . . **A033 607**

WATSON, R.L., and BEHRENS, E.W., "Hydraulics and Dynamics of New Corpus Christi Pass, Texas: A Case History, 1973-75," Sept. 1976.

Keywords: *Corpus Christi Pass, Texas, Sediment transport, Tidal discharge, Tidal hydraulics, Tidal inlets*

A case history of the hydraulics and sedimentation of the Corpus Christi Water Exchange Pass, Texas, from 1973-75 is presented. Qualitative data are given on longshore sediment transport, tidal differentials, flood and ebb tidal discharge, wind waves, and local winds to explain bathymetric changes in the Pass.

GITI 10 . . . . . **A033 419**

FINLEY, R.J., "Hydraulics and Dynamics of North Inlet, South Carolina, 1974-75," Sept. 1976.

Keywords: *North Inlet, South Carolina, Sediment transport, Tidal hydraulics, Tidal inlets*

Variation in wave parameters, beach and inlet morphology, and tidal hydraulics are discussed in relation to climatic patterns at North Inlet, South Carolina.

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GITI 11 . . . . . **A040 021**

MAYOR-MORA, R.E., "Laboratory Investigation of Tidal Inlets on Sandy Coasts," Apr. 1977.

Keywords: *Hydraulic models, Tidal inlets*

A movable-bed inlet model is used to study inlet hydraulics for a variety of inlet configurations and for various conditions. Parameters useful to classify inlet hydraulics are suggested, and inlet stability by re-examining the inlet cross-sectional area versus prism relationship is discussed.

GITI 12 . . . . . **A042 651**

KIESLICH, J.M., "A Case History of Port Mansfield Channel, Texas," May 1977.

Keywords: *Port Mansfield, Texas, Sediment transport, Tidal inlets, Tidal prisms*

Report presents a case history and analysis of Port Mansfield channel, an artificial, jettied inlet between the Gulf of Mexico and Laguna Madre, Texas; and the results of an office study of available field data at the channel from construction in 1957 to 1975.

GITI 13* **A045 523**

ESCOFFIER, F.F., "Hydraulics and Stability of Tidal Inlets," Aug. 1977.

Keywords: *Masonboro Inlet, North Carolina, Mission Bay, California, Rollover Fish Pass, Texas, Tidal inlets*

Report summarizes several important basic developments pertaining to analysis of the hydraulics and related stability of tidal inlets. The original inlet stability concept proposed by Escoffier is extended in light of recent work. Tidal inlet characteristics and functional design requirements as well as case studies of selected inlets on the U.S. coasts are briefly discussed.

GITI 14 . . . . . **A050 315**

SEELIG, W.N., HARRIS, D.L., and HERCHENRODER, B.E., "A Spatially Integrated Numerical Model of Inlet Hydraulics," Nov. 1977.

Keywords: *Computer programs, Currents, Mathematical models, Storm surge, Tidal inlets, Tides, Tsunamis*

This report discusses the development of a simple numerical model for the prediction of coastal inlet velocities, discharge, and resulting bay level fluctuations. The model is a time-marching model that simultaneously solves the area-averaged momentum equation for the inlet and the continuity equation for the bay. It is assumed that the bay surface elevation remains horizontal as it rises and falls. At each time step the geometric and hydraulic factors describing the inlet-bay system are calculated by evaluating flow conditions throughout the inlet and by spatially integrating this information to determine coefficients of the first-order differential equations.

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This model, which includes the important terms in the equation of motion, is flexible, easy and inexpensive to use, and gives a good estimate of the inlet-bay system hydraulics for various conditions. The model can be used for single or multiple inlets, bays, and seas.

The report includes the model theory and derivation, a FORTRAN computer program. Examples are given to illustrate how the model may be used to predict coastal inlet response to astronomical tides, seiching, tsunamis, and storm surges.

GITI 15 . . . . . **A055 523**

SAGER, R.A., and SEABERGH, W.C., "Physical Model Simulation of the Hydraulics of Masonboro Inlet, North Carolina," Nov. 1977.

Keywords: *Hydraulic models, Inlets, Masonboro Inlet, North Carolina*

The Masonboro Inlet fixed-bed model study was conducted to determine the ability of existing physical modeling techniques to predict the hydraulic characteristics of an inlet-bay system, and to determine whether simple tests, performed rapidly and economically, could be useful in predicting the effects of proposed inlet improvements. This report presents model verification and prediction data as well as analyses concerning a comparison of model results and effects of waves on model hydraulics.

GITI 16 . . . . . **A063 986**

NUMMEDAL, D., and HUMPHRIES, S.M., "Hydraulics and Dynamics of North Inlet, South Carolina, 1975-76," Sept. 1978.

Keywords: *North Inlet, South Carolina, Tidal inlets*

North Inlet, South Carolina, was selected as a natural tidal inlet for investigation within the scope of the Army Corps of Engineers' program on General Investigations of Tidal Inlets. Over a 2-year period, from July 1974 to June 1976, eight 2-week intensive field sessions were conducted at the inlet. Three tide gages provided nearly continuous water surface elevation records for the ocean and tidal creeks throughout the period of investigation. The analysis presented in this report focuses on three attributes of the inlet environment: (a) the inlet hydraulics, (b) the longshore currents adjacent to the inlet, and (c) the seasonal morphologic change of the North Inlet tidal deltas and adjacent beaches.

GITI 17 . . . . . **A077 686**

JAIN, S.C., and KENNEDY, J.F., "An Evaluation of Movable-Bed Tidal Inlet Models," Feb. 1979.

Keywords: *Movable-bed modeling, Sediment transport, Tidal hydraulics, Tidal inlets*

The objective of this study was to evaluate the effectiveness of movable-bed tidal inlet hydraulic models in predicting prototype behavior, by comparing model predictions with the observations made in the prototype, and to examine the scaling requirements for such models.

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GITI 18 . . . . . .

SEABERGH, W.C., and SAGER, R.A., "Supplementary Tests of Masonboro Inlet Fixed-Bed Model: Hydraulic Model Investigation, "May 1980.

Keywords: *Fixed-bed modeling, Hydraulic models, Masonboro Inlet, North Carolina, Tidal inlets*

This report describes supplemental tests of the Masonboro Inlet fixed-bed model not reported in GITI Report 15. Three separate studies were performed in the tests. The first study examined the effects of the closing of various bay channels on the inlet's hydraulics; the second examined the effects of the addition of a south jetty to the existing condition, which has a single north jetty, and the resulting hydraulics for various weir evaluations on both jetties. The third study examined the use of a tracer material and closely paralleled the hydraulic testing sequence discussed in the previous report.

GITI 19 . . . . . (in preparation)

GITI 20 . . . . . .

VINCENT, C.L., and CORSON, W.D., "The Geometry of Selected U.S. Tidal Inlets," May 1980.

Keywords: *Tidal inlets*

The geometry of the throat and ebb delta of 67 U.S. tidal inlets is investigated. Thirteen parameters indicative of the tidal inlet geometry are defined and measured with correlations developed. Cluster analysis and discriminant analysis are applied to the data, and an objective classification of the inlets into six groups is achieved.

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8. REPRINTS

R 1-66 . . . . . 631 518

WILLIAMS, L.C., "An Ocean Wave Direction Gage," Feb. 1966.

Keywords: *Instrumentation, Wave gages*

This paper outlines laboratory and short-term field testing of the use of an ultrasonic flow device for determining the direction of approach of ocean waves. The ultrasonic flowmeter measures the bidirectional flow of water past a pair of sensing elements. The direction of flow sensing is in a plane in line with the sensing elements. The output of the ultrasonic flowmeter is fed to a strip-chart recorder which indicates the relative magnitude of the waterflow. Thus, alinement of the water flowmeter into an ocean wave train may provide the direction of approach of the wave.

R 2-66* 631 519

SAVILLE, T., Jr., GARCIA, W.J., and LEO, C.E., "Breakwaters with Vertical and Sloping Faces," Feb. 1966.

Keywords: *Breakwaters, Wave forces, Wave transmission, Waves*

An important element of coastal engineering is the design of breakwater structures. Design criteria now permit efficient and economic building of breakwater structures; new research and evaluating performance of existing structures result in a constant improvement of design criteria. This paper summarizes the progress made in the field since 1953.

R 3-66* 631 520

BERG, D.W., "Factors Affecting Beach Nourishment Requirements, Presque Isle Peninsula, Erie, Pennsylvania," Feb. 1966.

Keywords: *Beach nourishment, Great Lakes, Pennsylvania—Lake Erie and Presque Isle*

The use of artificial beaches as protective shore structures is becoming so popular that borrow sources of well-suited fill material are becoming difficult to find. Accordingly, borrow sources of less suitable material are being used. Research and evaluation of existing artificial beaches continue to determine the behavior of various types of fill after exposure to the littoral regime. This paper summarizes the results of beach replacement and continuing nourishment at Presque Isle Peninsula, Erie, Pennsylvania; compares borrow material with natural material by showing before-and-after profiles; and correlates rates of volumetric changes with changes in lake level.

R 4-66 . . . . . 636 951

FAIRCHILD, J.C., "A Tractor-Mounted Suspended Sand Sampler," June 1966.

Keywords: *Instrumentation, Nags Head, North Carolina, Sand sampler, Suspended sediments, Ventnor, New Jersey*

The transport of suspended material by the action of wave-induced littoral currents comprises a significant part of the total material transported along the U.S. shorelines. Field measurements of material in suspension are needed to guide laboratory studies of sand in suspension, and to assure better understanding of the far greater complexity of

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the suspension mechanism in nature in contrast to the much simpler regime caused by uniformly generated laboratory waves. To meet these needs, a tractor-mounted suspended sand sampler has been developed at the CERC laboratory. The development and the projected use of this sampler, which can be operated from the average fishing pier, are described in this paper. Field operations were conducted at Nags Head, North Carolina, and at Ventnor, New Jersey.

R 1-67* 652 025

CALDWELL, J.M., "Coastal Processes and Beach Erosion," Jan. 1967.

Keywords: *Erosion, Shore processes*

With few exceptions, streams are adding little material to the beaches, and present loss of material from the beaches is essentially a permanent loss. The dominant erosive force is wind-generated wave action; the dominant zone extends from the 50-foot contour to shore. Wave period, length, height, and steepness are important in determining the effect of waves on beaches. Changes in these parameters can be computed for great distances from the fetch area. Short storm waves drag material from the beach and deposit it in deep water; long swells push offshore material back onto the beach. In this paper the New Jersey shore, 120 miles long and broken by 10 inlets, is examined as a field laboratory of shore processes.

R 2-67* 659 170

HALL, J.V., Jr., "Wave Tests of Revetment Using Machine-Produced Interlocking Blocks," Aug. 1967.

Keywords: *Interlocking blocks, Revetments*

There is a growing requirement for relatively low-cost shore protection in protected bodies of water such as bays and estuaries. The interlocking-block revetments explained in this paper may help this need. These revetments are simple to install and the material involved is comparatively inexpensive.

R 3-67* 659 573

SAVILLE, T., Jr., "Rock Movement in Large-Scale Tests of Riprap Stability Under Wave Action," Aug. 1967.

Keywords: *Riprap, Stability, Waves*

This paper summarizes a presentation based mainly on "time-lapse" motion pictures. Two rubble revetments were tested in the large wave tank at CERC; results of these revetment tests are presented here. The first revetment was composed of a Kimmswick limestone; the median weight of the pieces was 120 pounds. The other revetment was characterized by a top layer of 80-pound tribars.

R 4-67* 659 172

BERG, D.W., and WATTS, G.M., "Variations in Groin Design," Sept. 1967.

Keywords: *Groins*

Considering all types of structures used for shore protection purposes, the groin is probably the most widely used and yet it is perhaps the one structure least understood. This paper points out pertinent features of basic types of groins and illustrates some of the many variations which have been built in the United States.

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R 1-68* 672 613

DARLING, J.M., "Surf Observations Along the United States Coasts," Feb. 1968.

Keywords: *Wave climatology, Waves*

This paper summarizes the surf observations program at CERC. The program was established in 1954 and is a cooperative project with the U.S. Coast Guard. Initially, 27 Coast Guard Stations located at various points along the three U.S. coasts participated in this program. Visual observations of the surf were made at 4-hour intervals according to prescribed methods, (visibility permitting) and recorded on standard forms developed by CERC.

R 2-68* 672 614

GALVIN, C.J., Jr., "Longshore Current Velocity: A Review of Theory and Data," Aug. 1968.

Keywords: *Currents*

This paper reviews published field and laboratory observations that permit a description of longshore current flow, and evaluates the theories proposed to predict longshore current velocity. The review covers papers published in North American sources; it is selective rather than exhaustive, emphasizing recent results and omitting data known to exist but unpublished.

R 3-68* 673 621

GALVIN, C.J., Jr., "Breaker Type Classification on Three Laboratory Beaches," June 1968.

Keywords: *Breakers, Waves*

This paper quantitatively classifies breaker type on three laboratory beaches. This classification is made empirically by correlating dimensionless steepness parameters, based on wave height, wave period, and beach slope, with the breaker type obtained from films of a wide range of conditions.

R 1-69* 694 204

BERG, D.W., and DUANE, D.B., "Effect of Particle size and Distribution on Stability of Artificially Filled Beach, Presque Isle Peninsula, Pennsylvania," Apr. 1969.

Keywords: *Beach nourishment, Presque Isle, Pennsylvania*

Presque Isle Peninsula, a sandy spit on the south shore of Lake Erie, has experienced continued erosion of its lakeside shoreline since first attempts to stabilize and halt its natural eastward migration. In 1965, sandfill, coarser than fill previously used as well as coarser than that which naturally existed on the peninsula, was placed on a section of beach. Annual data collection surveys were then made in the fill area and in or adjacent parts of the peninsula. Analysis of the data indicates the test area involving coarse sandfill has undergone minimal material loss and maintained a relatively stable profile. On the basis of this experiment, it is judged that definite shore stabilization occurs, with attendant benefits such as substantially reduced nourishment requirements, from the utilization of sandfill that has size characteristics superior to that originally found on an eroding beach.

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R 2-69 . . . . . 697 531

WEYMOUTH, O.F., and MAGOON, O.T., "Prototype Investigation of Stability of Quadripod Cover Layer, Santa Cruz Harbor, California," Sept. 1969.

Keywords: *Armor units, Quadripods, Santa Cruz Harbor, California*

This paper presents the results of a 4-year study of the stability of a prototype breakwater armor layer composed of 28-ton concrete quadripods. The study was conducted by measuring the incident wave height and the quadripod movements during this period. The ultimate goal of this study is the verification of empirical breakwater design equations.

R 3-69* 697 532

SAVAGE, R.P., and WOODHOUSE, W.W., Jr., "Creation and Stabilization of Coastal Barrier Dunes," Sept. 1969.

Keywords: *Dunes*

This paper presents the results of field experiments to create and stabilize barrier dunes along the North Carolina coast during the past decade. All of the experimental work has been carried out on low-lying barrier islands, a geographical environment typical of most of the Atlantic and gulf coasts of the United States. The experimentation has been directed toward the use of sand fences and dune grasses to catch and hold windblown sand and thus create and maintain a barrier dune.

R 4-69* 697 533

BERG, D.W., "Systematic Collection of Beach Data," Sept. 1969.

Keywords: *Data collection, LEO*

In 1967, the U.S. Army, Corps of Engineers and the State of California initiated a cooperative program to collect empirical data at selected locations along the California coast. The objective was to establish a reservoir of repetitive, systematic observations, by qualified personnel, with the hope of securing a better understanding of the physical characteristics of the California shore and the littoral processes occurring there.

R 1-70 . . . . . 702 003

MEISBURGER, E.P., and DUANE, D.B., "Shallow Structural Characteristics of Florida Atlantic Shelf as Revealed by Seismic Reflection Profiles," Oct. 1970.

Keywords: *Continental Shelf, Florida, ICONS, Sediments, Seismic reflection*

During 1965-66, CERC collected 2,600 statute miles of shallow and medium penetration seismic reflection profiles from the east Florida Continental Shelf as input to a long-range program to inventory offshore sand deposits. A general preliminary review of all geophysical profiles has been made to define broad regional aspects of shelf and subbottom morphology and to provide continuity and background for detailed studies of selected areas which are now in varying stages of completion.

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R 2-70 . . . . . 703 583

DUANE, D.B., "Sand Inventory Program," Oct. 1970.

Keywords: *ICONS, Sediments*

This paper describes CERC's continuing program to locate and delineate offshore deposits of sand suitable for beach restoration and stabilization. The exploration phase of this Sand Inventory Program utilizes seismic reflection profiling supplemented by coring of the marine bottom. After the exploration or data collection phase of the program has been completed, the task is to define the characteristics, extent, and quantity of material existing offshore that meets criteria for use in shore protection works. The data collection phase of the sand inventory studies conducted by CERC to date include detailed and reconnaissance surveys of: parts of New Jersey; the east coast of Florida; the New England area; the Norfolk, Virginia, area; and the south shore of Long Island.

R 3-70* 706 469

SAVILLE, T., Jr., "Coastal Regime, Recent U.S. Experience," June 1970.

Keywords: *Breakwaters, Currents, Port structures*

This paper discusses recent laboratory and field studies in the United States which are considered pertinent to the development of a better understanding of the interaction of the beach and the littoral zones with and without manmade structures.

R 4-70* 712 652

GALVIN, C.J., Jr., "Breaker Travel and Choice of Design Wave Height," May 1970.

Keywords: *Breakers, Breakwaters, Wave forecasting, Wave runup*

This paper presents measurements of breaker depth and breaker travel for periodic waves breaking on plane laboratory slopes. It shows that, in the structural design of coastal works, breaker travel may significantly affect the choice of design wave height.

R 1-71* 732 606

HARRIS, D.L., "The Analysis of Wave Records," Sept. 1971.

Keywords: *Wave climatology, Wave gages, Wave records*

Data obtained from two surface profile wave gages and two pressure wave gages at the Steel Pier in Atlantic City, New Jersey, are used to check the consistency of the analysis variables obtained from a given set of records by several commonly used analysis procedures.

R 2-71* 732 637

ESTEVA, D.C., and HARRIS, D.L., "Comparison of Pressure and Staff Wave Gage Records," Sept. 1971.

Keywords: *Wave climatology, Wave gages*

Simultaneous records from two pressure gages located at different depths, a step-resistance relay gage, and a continuous-wire staff gage have been collected at Atlantic City, New Jersey. Spectra and cross-spectra are computed using the fast

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Fourier transform algorithm method proposed by Cooley and Tukey (1965). Individual harmonics of the pressure energy spectra are compensated for pressure attenuation according to classical theory. Results indicate better agreement is obtained between the wave height and the spectra computed from the compensated pressure gages and those computed from the continuous-wire staff gage than between the two surface gages.

R 3-71* 732 643

TELEKI, P.G., and ANDERSON, M.W., "Bottom Boundary Shear Stresses on a Model Beach," Sept. 1971.

Keywords: *Preston probe, Shear stresses*

The maximum amplitude of shear stress in the bottom boundary layer of water waves was evaluated with a Preston probe inclined on a 1:12.5 slope beach. Near-bottom velocity profiles were obtained in laminar and developing turbulent flow conditions from which the experimental boundary layer thicknesses were evaluated. Agreement between experimental bottom velocities and those calculated from Airy theory deteriorate with decreasing depth on the beach resulting in lower shear-stress values than predicted by linear theory. The measured boundary layer thickness on the slope exceeds the predicted for horizontal bottom, increasing shoreward to some critical depth outside the breaker zone from where it decreases shoreward. The influence of roughness on the shear-stress distribution is considerable in the "offshore" region, but becomes negligible near the breaker zone. On a smooth bottom the coefficient of friction agrees with Kajiura's (1968) expression.

R 4-71* 732 607

MADSEN, O.S., "Waves Generated by a Piston-Type Wavemaker," Sept. 1971.

Keywords: *Piston-type wave generator, Waves*

When a wavemaker generates a finite number of waves, one of the first and one of the last waves, in such a burst, are considerably larger than the average. A mathematical model, based on the linearized governing equations, is used for the particular problem of the waves generated by a sinusoidally moving piston-type wavemaker starting from rest. Theoretical results for the magnitude of the large wave relative to the average agree fairly well with experiments; however, the actual wave height is smaller in the experiments than predicted by theory. An extension of the classical wavemaker theory to second order shows that finite amplitude effects do not offer an explanation. However, pistons rarely fit the tank dimensions exactly, and an approximate evaluation indicates that the discrepancy between predicted and observed wave heights can be attributed to the effects of leakage around the piston.

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R 5-71* 732 645

DUANE, D.B., "Synoptic Observations of Sand Movement," Sept. 1971.

Keywords: *RIST, Sediment transport, Sediment*

In recognition of the engineering need to better understand coastal processes, CERC, in cooperation with the Atomic Energy Commission (AEC), initiated a multiagency program to create a viable Radioisotopic Sand Tracer (RIST) program. In addition to the development of the techniques and technology necessary to trace nuclide-labeled particles in the marine environment, objectives of the program are: (a) understanding the mechanics of sediment movement (both entrainment and transport), (b) patterns of movement, and (c) the volume of sediment movement. Field experiments have been carried out on straight coastal segments unaltered by engineering works as well as on coastal segments affected by engineering works, such as groins and harbor jetties.

R 6-71 . . . . . 732 608

BRASHEAR, H.R., et al., "Processing and Analysis of Radioisotopic Sand Tracer (RIST) Study Data," Sept. 1971.

Keywords: *Computer programs, RIST*

Data collected during the RIST field tests are processed through digital computers. Data treatment requires computing and plotting the detector position and correcting the corresponding radiation count rates for radioactive decay. The field data are recorded on punched paper tape, edited, and then transferred to magnetic tape for input to data reduction programs. The navigation data, which are in the form of distances to shore-based microwave responder beacons, are tested for spurious values by comparison with the theoretical maximum travel distances of the survey vehicle between successive fixes. The navigation ranges are then converted to rectangular geographical coordinates. Present emphasis is in the development of computer programs to construct a count rate surface from data collected along track lines.

R 7-71* 732 646

JAMES, W.R., "A Class of Probability Models for Littoral Drift," Sept. 1971.

Keywords: *Sediment tracer, Sediment transport*

The major goal in the development of sediment tracer technology is to produce an accurate method for the field measurement of short-term volume littoral rate. Many of the technical difficulties involved in tagging, injecting, and sensing the movement of radioisotope and tracers in the littoral zone have been overcome by the RIST project. However, quantitative determination of volume drift rate requires more than knowledge of tracer position in time and space. A mathematical model is required to relate the flux of tracer material to the sediment flux. This paper attempts to present a class of such models which lead to a particularly simple form for the calculation of littoral volume drift rate.

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R 8-71* 732 609

MAGOON, O.T., and SARLIN, W.O., "Effect of Long Period Waves on Hydrographic Surveys," Sept. 1971.

Keywords: *Hydrographic surveys, Santa Cruz Harbor, California*

In conjunction with routine hydrographic surveys at Santa Cruz Harbor, California, bottom elevation discrepancies were observed which were not associated with positional errors. It was suspected that these errors were associated with long-period wave activity, common at this particular location on the Pacific coast. Hydrographic soundings are usually obtained by floating craft using either echo-sounding techniques or a "lead line." Both of these techniques utilize the instantaneous water surface at the survey boat as a datum reference, normally determined by a water level recorder. Based on the analysis of 50 repetitions of a well-monumented cross section in Santa Cruz Harbor, it was concluded that long-period waves affect the results of hydrographic surveys by slowly varying the datum plane. In the case of Santa Cruz Harbor, the maximum error due to this effect would be ±1.5 feet.

R 1-72* 746 365

THOMPSON, E.F., and HARRIS, D.L., "A Wave Climatology for U.S. Coastal Waters," May 1972.

Keywords: *Wave climatology, Waves*

CERC has operated wave gages along the Atlantic, Pacific, and gulf coasts of the United States for the past 20 years. Cumulative wave height distribution functions for 10 gage locations have been studied in the format of the exponential distribution. One complete year of data, at six observations per day, appears to give a reliable wave height distribution up to the 1-percent level of occurrence. Wave data from shipboard weather reports have been compared to wave gage data and found to be of some use in describing long-term summaries of coastal wave height conditions.

R 2-72* 755 178

WOODHOUSE, W.W., Jr., SENECA, E.D., and BROOME, S.W., "Marsh Building with Dredge Spoil in North Carolina," July 1972.

Keywords: *Dredge spoil, Marsh ecology*

The value of tidal marsh for shoreline protection and as a nursery ground and source of energy for a high proportion of commercial and sports fishery species has become widely recognized in recent years. Dredge spoil, produced in the maintenance of navigation channels within sounds and estuaries, may be a means of establishing new marsh to replace some of that which has been lost. Therefore, the possibility exists of combining two desirable objectives in one operation—the stabilization of dredge spoil and the establishment of new tidal marsh. This paper is a progress report on a study initiated in the fall of 1969 designed to explore this possibility.

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R 3-72* 754 869

WILLIAMS, S.J., and DUANE. D.B., "Regional Shelf Studies: A Guide to Engineering Design," Sept. 1972.

Keywords: *Continental Shelf, Geology, ICONS, Offshore structures*

The Inner Continental Shelf Sediment and Structure (ICONS) program has been initiated by CERC to provide data for a comprehensive regional study of the geology, sedimentary processes, and foundation engineering character of the U.S. shore and Inner Continental Shelf. Main emphasis is directed toward locating and delineating sand resources potentially available for shoreline nourishment and toward geologic interpretation of the shelf history during the last 25,000 years. Basic data are derived by utilization of high resolution, medium penetration, seismic reflection profiling and pneumatic vibratory coring devices. To date, 8,400 miles of seismic profiles and 1,200 sediment cores (≤30 feet long) have been obtained from the Atlantic shelf off New England, Long Island, New Jersey, Delaware, Maryland, Virginia, North Carolina, and eastern Florida. Data coverage is confined to water depths of 30 to 150 feet, within approximately 15 miles of shore.

R 4-72* 754 890

MAGOON, O.T., JARMAN, J.W., and BERG, D.W., "Use of Satellites in Coastal Engineering," Aug. 1972.

Keywords: *Remote sensing, Satellites*

A new concept, using earth satellites in data gathering, has been generated. These satellites may observe areas of the coast and adjacent seas during times when other methods of sensing would be very difficult or essentially impossible. This paper describes the unmanned Earth Resources Technology Satellite (ERTS) and the manned Skylab Satellite.

R 5-72* 754 868

GALVIN, C.J., Jr., "Finite-Amplitude Shallow-Water Waves of Periodically Recurring Form," Sept. 1972.

Keywords: *Waves*

Finite-amplitude, periodic, sinusoidal waves generated in constant-depth shallow water break down into two or more waves traveling at speeds dependent on their height. These waves are here called solitons, and the amplitude of the larger wave temporarily decreases during the resulting interaction. This decrease in amplitude can be qualitatively explained by the acceleration and spreading of the larger wave when its leading edge encounters the deeper water of the smaller wave. The larger wave regains its initial amplitude on passing through the smaller wave. If followed long enough, the interacting solitons periodically assume the initial waveform. This paper qualitatively describes the significant features of solitons that can be learned from experimental measurements of waveform.

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R 1-73* 757 973

MAGOON, O.T., and SHIMIZU, N., "Use of Dolos Armour Units in Rubble-Mound Structures in the Arctic," Aug. 1973.

Keywords: *Armor units, Dolos, Humboldt Bay, California, Rubble-mound breakwaters*

In the design of coastal structures subjected to high breaking waves, the designer finds that conventional structures constructed with natural stone became impracticable. When the design wave exceeds about 30 feet (10 meters), current practice normally dictates the use of concrete blocks of various shapes which are relatively more stable than stone. A review of published stability coefficients for armor units indicates that the dolos shape yields the most stable structure for a given weight of unit of any nonarticulated shape known. After review of published literature and laboratory testing, a design for rehabilitation of the seaward heads of the Humboldt jetties at the entrance to Humboldt Bay, California, was formulated using dolosse. A summary of results of the hydraulic model tests conducted for this project is presented in the paper.

R 2-73* 757 974

HARRIS, D.L., "Characteristics of Wave Records in the Coastal Zone," Oct. 1973.

Keywords: *Wave analysis, Wave characteristics, Waves*

Wave recordings are examined to evaluate the quality of wave data available from instruments and photos, and to determine the extent to which the record analyses confirm or contradict speculation about wave characteristics published before many instrumental wave records were generally available.

R 3-73* 757 975

WEGGEL, J.R., "Maximum Breaker Height," Nov. 1973.

Keywords: *Breakers*

The largest breaking wave to which a coastal structure might be exposed often represents the critical design condition for that structure. Consequently, a knowledge of the geometry and kinematics of breakers resulting from specific deepwater waves is essential for both the functional and economic planning of shore protection works. Among the factors that determine the maximum breaker height are: (a) The depth of water in which the structure is sited; (b) the beach slope and bathymetry in front of the structure, including refraction effects; and (c) the variables which describe the incident waves in deep water. Unfortunately, it is not as yet possible to adequately describe a breaking wave in mathematical form; hence an essentially empirical approach is usually adopted to describe geometry and kinematics of breakers. This paper reevaluates some available breaker data presented in a form easily applied to the solution of coastal engineering problems.

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R 4-73* 766 106

GALVIN, C.J., Jr., "Wave Breaking in Shallow Water," Mar. 1973.

Keywords: *Breakers*

This paper summarizes empirical knowledge of the breaking process for reference by those preparing theoretical studies on the breaking process. The paper reviews physical results of theoretical investigations and experimental work on breaker type, maximum wave height, and breaker travel, and attempts to synthesize the available information.

R 5-73* 766 378

MAGOON, O.T., "Use of Earth Resources Technology Satellite (ERTS-1) in Coastal Studies," Apr. 1973.

Keywords: *Aerial photography, ERTS, Remote sensing*

This paper summarizes some of the possibilities of the use of ERTS-1 imagery in coastal studies. The material presented is preliminary and is a result of the synergistic contributions of personnel of the NASA-Goddard Space Flight Center and CERC.

R 6-73* 766 379

HALLERMEIER, R.J., "Design Considerations for a 3-D Laser Doppler Velocimeter for Studying Gravity Waves in Shallow Water," Feb. 1973.

Keywords: *Instrumentation, Velocity measurements*

A laser velocimeter system using three frequency-modulated light beams and one detector for measurement of the instantaneous velocity vector in reversing flow is considered. An analysis of the scattering and detection processes by means of the Mie and optical mixing theories is outlined. A system proposed for gravity wave studies uses an argon-ion laser and three Bragg cells as a source and a photomultiplier detector of the light backscattered from 0.2-micrometer-diameter spheres, introduced into the flow in a low concentration, and can measure local velocity vectors of magnitude between 0.1 and 3.0 minutes per second, with turbulent fluctuations of 1 percent or greater intensity.

R 7-73* 765 889

SONU, C.J., and JAMES, W.R., "A Markov Model for Beach Profile Changes," Mar. 1973.

Keywords: *Markov, Profiles*

An apparent complex time history of beach geometry can be described as a specific case of first-order Markov process. Under the assumptions that the profile transition is controlled only by random excitations from waves and that the transition probability is identical for all the possible states of beach profile, it is demonstrated that a beach profile time series contains cycles having negative binomial distribution. A simplified case in which the transition probability is taken as 1/2 (i.e., equal probability for either erosional or accretional transition for any profile state) is derived through both numerical simulation and theoretical derivation, the result of which shows reasonable agreement with field observations.

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R 8-73* 770 190

WEGGEL, J.R., "Maximum Breaker Height for Design," July 1973.

Keywords: *Breakers*

The range of breaker heights to which a structure is subjected depends critically on the range of depths at the structure site with the largest breaker occurring for the greatest depth at the site. This maximum design breaker height, H_b, is a function of depth at the structure, d_s, wave period, T, and the postconstruction beach slope, m, on which the structure is situated. The relationship between the above variables and breaker height must be based on empirical data since it is not possible at present to adequately describe breaking waves in mathematical terms. This paper presents a reevaluation of some previously published breaker data in order to establish this maximum breaker height and to present the results in a form easily applied to engineering design calculations.

R 9-73* 774 269

BERG, D.W., and HAWLEY, E.F., "Time-Interval Photography of Littoral Phenomena," July 1973.

Keywords: *California–Newport and Pt. Mugu, Photography*

The collection of most data on littoral phenomena usually is based on the requirement of personnel and equipment actually being onsite for specific periods of time. An approach to minimize this requirement involves the use of a photographic technique, using time-interval cinematography. Two such systems have been used at sites in California, Pt. Mugu and Newport Beach. This method incorporates commercially available 16-millimeter motion picture cameras with automatic lenses, remotely programed to shoot selected lengths of film at predetermined periods.

R 10-73* 770 184

MASON, C., and SORENSEN, R., "Character and Stability of A Natural Tidal Inlet," July 1973.

Keywords: *Brown Cedar Cut, Texas, Tidal inlets*

An environmental study was conducted at Brown Cedar Cut, a natural unstable barrier beach inlet connecting East Matagorda Bay, Texas, with the Gulf of Mexico. The objectives of this study were to determine the physical and hydraulic properties of the inlet, and to investigate the inlet's historical stability, as well as its short-term response to a number of physical processes.

R 11-73* 770 192

HERRON, W.J., Jr., "Case History of Mission Bay Inlet, San Diego, California," July 1973.

Keywords: *Mission Bay, California, Tidal inlets*

The Mission Bay Inlet was designed as a "nonscouring" entrance channel by the U.S. Army Engineer District, Los Angeles, in 1946. Construction of the inlet was completed in 1959 and the entire project in 1963. This case history was prepared under contract to CERC, and project data and aerial photos were obtained from the Los Angeles District, and the City of San Diego.

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R 12-73* 770 181

GALVIN, C.J., Jr., "A Gross Longshore Transport Rate Formula," July 1973.

Keywords: *Sediment transport*

This paper presents an empirical relation between gross longshore transport rate, Q_g, and the local mean breaker height, H, as a first approximation for engineering predictions. An hypothesis is also presented to explain the empirical relation.

R 13-73* 770 179

DAS, M.M., "Suspended Sediment and Longshore Sediment Transport Data Review," July 1973.

Keywords: *Suspended sediments, Turbulent boundary layer*

A review of laboratory and field studies on suspended sediment under waves shows that although about five analytical or semiempirical approaches have been attempted to predict the vertical distribution of suspended sediment, none of the approaches has had its general validity proven. This is mainly due to the lack of knowledge about the characteristics of turbulence of the wave boundary layer and to the lack of a suitable suspended-sediment measuring technique for use in waves. Six different suspended-sediment measuring techniques have been used in the studies reviewed. Although none of them gives completely reliable laboratory or field measurements, an optical system appears to show promise in obtaining information on the mechanics of suspension under waves.

R 14-73* 770 191

FAIRCHILD, J.C., "Longshore Transport of Suspended Sediment," July 1973.

Keywords: *Nags Head, North Carolina, Sediment transport, Suspended sediments, Ventnor, New Jersey*

An excess of 800 suspended sediment samples were collected from stations along City Pier, Ventnor, New Jersey, and Jennettes Pier, Nags Head, North Carolina, using a tractor-mounted pump sampler. Results are summarized in a series of scatter plots which relate suspended-sediment concentration to nozzle height, wave height, water depth, and sampling distance from an observed wave breaker line. Results are compared to CERC laboratory data, to two excerpted concentrations from unidirectional flow tests, and to CERC TR-4 design curve of longshore wave energy versus transport.

R 15-73* 770 182

BALSILLIE, J.H., and BERG, D.W., "State of Groin Design and Effectiveness," July 1973.

Keywords: *Groins*

An annotated bibliography on groins (Balsillie and Bruno, 1972) has provided the background for this paper. A review of functional design criteria is presented including groin length, height, spacing, permeability-adjustability, and orientation. A discussion of coastal processes and their relationship to groin design and effectiveness is also given.

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R 16-73* 770 178

MAGOON, O.T., HAUGEN, J.C., and SLOAN, R.L., "Coastal Sand Mining in Northern California, U.S.A.," July 1973.

Keywords: *Sand mining*

This paper discusses the commercial mining of sand along the California coastline. This mining activity includes all methods of sand mining (dragline, self-propelled bottom-dump scrapers, diesel shovels, etc.) and may be classified by littoral zone locations as (a) mining from a beach foreshore or backshore area wetted by the normal tidal range, (b) mining within a river mouth or other estuary upstream from the ocean but still within the tidal zone, and (c) mining from bluff or dune areas not wetted by the normal range of tides but still within the littoral system.

R 17-73* 770 194

MAGOON, O.T., and PIRIE, D.M., "Remote Sensing in the Study of Coastal Processes," July 1973.

Keywords: *Radar, Remote sensing, Sediment transport*

The quantifiable determination of important coastal parameters remotely rather than by in situ measurements combined with automatic data reduction and analysis will result in a greatly increased understanding of the parameters being studied. This paper gives a progress report on joint Corps of Engineers-National Aeronautics and Space Administration (NASA) efforts to apply remote sensing in coastal studies. The devices used were multiband photography, the infrared scanner, the Side-Looking Airborne Radar, and various image enhancement and processing devices.

R 18-73* 770 183

MAGOON, O.T., PIRIE, D.M., and JARMAN, J.W., "Coastal Applications of the ERTS-A Satellite," July 1973.

Keywords: *ERTS, Remote sensing*

This paper describes the Earth Resources Technology Satellite (ERTS) placed in orbit in July 1972 and the ERTS simulation high-altitude aircraft flights which have been flown for approximately 1 year. The ERTS satellite and simulation programs conducted by NASA have been developed to demonstrate the techniques for efficient management of the earth's resources. Results of the ERTS-A simulation flights flown at an altitude of 65,000 feet as related to coastal studies are also described. Simulations of both the RBV and MSS in coastal areas are presented.

R 19-73* 770 166

GALVIN, C.J., Jr., and HALLERMEIER, R.J., "Wave Runup on Vertical Cylinders," July 1973.

Keywords: *Cylinders, Wave runup*

As a wave passes a vertical cylinder, its shape, including its height, is affected by the presence of the cylinder. This paper presents measurements of wave height very near the surface of cylinders at selected cross sections. These experiments are motivated by the possibility that the wave height distribution around a cylinder can be used to measure wave direction. The height data in this paper are for periodic laboratory water waves propagating in one direction.

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R 20-73* 770 177

WEGGEL, J.R., "An Introduction to Oceanic Water Motions and Their Relation to Sediment Transport," 1973.

Keywords: *Deposition, Fluid flow, Sediment transport*

A brief discussion of those aspects of fluid flow important in sedimentation studies is presented as an introduction to discussion of the physical principles governing fluid flows. Examples of how these principles manifest themselves in the oceans, the assumptions made in simplifying the governing equations, and in some cases how the flow is related to sediment movement, are presented. Wave motions are discussed with regard to their increasing ability to agitate bottom materials as waves move shoreward across the Continental Shelf. Examples of observed current phenomena and the assumptions made to simplify the governing equations are presented. The important implication for shelf sediment transport studies is that care must be exercised in extrapolating surface wind and current observations to the near-bottom currents that are important in moving sediments.

R 21-73* 770 171

TELEKI, P.G., "Wave Boundary Layers and Their Relation to Sediment Transport," 1973.

Keywords: *Boundary layer flow, Sediment transport*

Sediment transport in the ocean is examined from the viewpoint of oscillating flows. Principles of both steady and unsteady boundary layers are reviewed and updated from recent experimental results. In the potential flow region the forcing function is represented by the combined effect of waves and currents. This paper is concerned mainly with wave-induced effects.

R 22-73* 770 172

DUANE, D.B., et al.,"Linear Shoals on the Atlantic Inner Continental Shelf, Florida to Long Island," 1973.

Keywords: *Atlantic coast, Continental Shelf, Shoals*

The Atlantic Inner Continental Shelf from Long Island to Florida is characterized by fields of linear, northeast trending shoals. The shoals exhibit up to 30 feet of relief, have side slopes of a few degrees, and extend for tens of miles. Clusters of linear shoals merge with the shoreface in water as shallow as 10 feet. Most of the shoals out to depths of 120 feet have been examined by means of seismic profiling, precision depth profiling, grab sampling, and coring; current monitoring has been conducted on a few shoals.

R 23-73* 770 193

HARRIS, D.L., "Wave Estimates for Coastal Regions," 1973.

Keywords: *Wave climatology, Waves*

Significant information about wave climate can be obtained from aerial photos, instrument records, visual observations, and wave hindcasts based on weather charts. This paper describes the types of wave data that are presently available, or could be made available by established techniques. The principal concern is with observation and analysis procedures that are being or have been used extensively.

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R 24-73* 770 180

PILKEY, O.H., and FIELD, M.E., "Onshore Transportation of Continental Shelf Sediment: Atlantic Southeastern United States," 1973.

Keywords: *Continental Shelf, ICONS, Sediment transport*

Evidence indicates beach and estuarine sands from the southeastern U.S. Atlantic coast are derived in part from the adjacent Continental Shelf. Abundant anomalies on the shelf show a close correspondence to abundant anomalies in adjacent shoreline and nearshore environments. Carbonate content and textural parameters of beach and shelf deposits show a correlation between the two environments on a regional scale. Close correlation of shelf- and shore-sediment parameters may reflect ultimate derivation of sediment from similar sources or simnilar environments of deposition during Pleistocene sea level fluctuations other than from onshore transportation.

R 25-73* 773 930

WATTS, G.M., VALLIANOS, L., and JACHOWSKI, R.A., "Controlling Littoral Drift to Protect Beaches, Dunes, Estuaries, and Harbor Entrances," 1973.

Keywords: *Beach nourishment, Sediment transport*

This report describes the present techniques employed in the United States for controlling littoral drift for beach and dune stabilization, and stabilization of entrances to harbors and estuaries.

R 26-73* 773 931

SAVILLE, T., Jr., "Report on Controlling Littoral Drift to Protect Beaches, Dunes, Estuaries and Harbor Entrances," 1973.

Keywords: *Beach nourishment, Sediment transport*

This report presents means of controlling littoral drift to protect beaches, dunes, estuaries, and harbor entrances, and discusses the establishment of artificial beaches.

R 1-74* 775 650

EVERTS, C.H., "Particle Overpassing on Flat Granular Boundaries," Nov. 1974.

Keywords: *Bedload, Sediment transport*

Under certain conditions, granular sediment moves as bedload over flat, loose, uniformly sized boundaries. This movement, designated here as overpassing, appears to occur without appreciably disturbing the stability of the boundary. An understanding of the overpassing mechanism will aid in defining the behavior of sand-size particles on a beach foreshore or other sedimentary surface.

R 2-74* 775 561

TELEKI, P.G., WHITE, J.W., and PRINS, D.A., "A Study of Oceanic Mixing with Dyes and Multispectral Photogrammetry," Oct. 1974.

Keywords: *Currents, Remote sensing, Turbulent flow*

The possibility of studying coastal currents and turbulent mixing by remote sensing is investigated. In mixed regions it is essential to identify the sources of constituent water masses, and their rate of propagation and discharge. Spectral responses of

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water-tracing dyes to various film-filter combinations were investigated under field and laboratory conditions. Preliminary results indicate that conservative tracers which are spectrally stable can also be reconstructed in color composites, providing a label for water masses of varying origins.

R 3-74* 775 651

TELEKI, P.G., RABCHEVSKY, G.A., and WHITE, J.W., "On the Nearshore Circulation of the Gulf of Carpentaria, Australia—A Study in Uses of Satellite Imagery (ERTS) in Remotely Accessible Areas," Oct. 1974.

Keywords: *ERTS, Gulf of Carpentaria, Australia, Remote sensing*

The Gulf of Carpentaria was studied from ERTS-imagery for August 1972 to January 1973. This inland sea was chosen as the test site to assess the usefulness of satellite imagery to the mapping of hydrologic parameters in areas of difficult access. The examination of the contents of MSS channels 4, 5, and 6, enhancements of these bands, and density slicing in two test areas indicates that sediment dispersal can be studied and mapped on a seasonal basis. Transport directions for coastal sediments in the months of August, November, and January were found to corroborate Cresswell's hypothesis about the bidirectional nature of nontidal currents along the east coast of the gulf. Accordingly, this current is northerly during the influx of type C waters, changing to southerly when type B water enters the gulf.

R 4-74* 777 706

BRUNO, R.O., and HIIPAKKA, L.W., "Littoral Environment Observation Program in the State of Michigan," 1974.

Keywords: *Lake Michigan, LEO*

Over the past 6 years CERC has recorded visual observations at selected ocean beach sites of waves and surf, nearshore currents, winds, and beach geometry. This program, known as the Littoral Environment Observation (LEO) program, has now been initiated in the Great Lakes. Data are collected through a cooperative effort between the Corps of Engineers (CERC and U.S. Army Engineer District, Detroit) and the State of Michigan (Department of Natural Resources). After a pilot program on Lake Michigan in the fall of 1971, the program was extended in May 1972 to include 20 State parks throughout the State on Lakes Superior, Huron, and Erie as well as Lake Michigan.

R 5-74* A002 112

PEACOCK, H.G., "CERC Field Wave Gaging Program," Sept. 1974.

Keywords: *Wave gages, Waves*

The wave-gaging program at CERC has been in operation since 1948. Initially, the step-resistance staff gage was the principal field wave gage. Later, the pressure-sensitive gage was added. Although improved versions of these gages are still in use, the step-resistance gage is now being replaced by the parallel inductive cable gage. The wave-measuring program has expanded from two gages at Atlantic City, New Jersey, to

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21 gages at 17 different locations at present. The data collected are used in CERC's wave and beach processes research, and routinely made available to local Corps of Engineers offices. In addition, data summaries are furnished interested persons or groups upon written request.

R 6-74* A002 113

HARRIS, D.L., "Finite Spectrum Analyses of Wave Records," Sept. 1974.

Keywords: *Spectral analysis, Wave records, Waves*

Quantitative descriptions of wave characteristics are needed for engineering design and for basic studies of wave generation and wave mechanics. The main problem in wave analysis is presenting the information of value for each application in the most convenient form. A derivation of the essential equations of spectrum analysis, with fewer restrictive assumptions and more direct application to ocean wave analysis, is presented in this paper.

R 7-74* A002 114

THOMPSON, E.F., "Results from the CERC Wave Measurement Program," Sept. 1974.

Keywords: *Wave records, Waves*

A useful result from the digital analysis of wave records is significant wave height and wave period corresponding to the highest density of spectral energy. Another potentially useful result is the wave energy spectrum which is computed with a fast Fourier transform algorithm. This paper discusses CERC methods of collecting, analyzing, and summarizing digital wave records, provides perspective on the uses and limitations of CERC's shallow-water wave energy spectra, and discusses the applicability of the Rayleigh distribution function for describing the distribution of individual wave heights under a variety of shallow-water conditions.

R 8-74* A002 300

HALLERMEIER, R.J., and JAMES, W.R., "Development of a Shallow-Water Wave Direction Gage," Sept. 1974.

Keywords: *Instrumentation, Wave gages*

This paper is a status report on an effort to develop a nearshore wave direction gage with a novel principle of operation. This point direction gage uses a thin pile in fairly shallow water to nonlinearly, but regularly, transform each steep incident crest, momentarily forming a bow wave. A few water level gages deployed around the pile sense the bilaterally symmetric transformation, and then the symmetry direction of a data set from the gages is electronically estimated. Preliminary laboratory tests have indicated direction measurements of high precision may be made from a few data on peak water level at a pile.

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R 9-74* A014 216

TELEKI, P.G., and PRINS, D.A., "Photogrammetric Experiments on Nearshore Mixing and Diffusion," Aug. 1974.

Keywords: *Aerial photography, Currents, Remote sensing*

Aerial multispectral photography and fixed-point metering were used in the study of coastal currents at two sites in California. The system combining current meters, low-altitude photography, and photodensitometric analysis of the suspended matter or tracer dyes, is well suited to the study of both advective and diffusive processes in the ocean. Experiments were conducted near marine structures to understand their influence on coastal circulation.

R 10-74* A003 778

MASON, C., "Regime Equations and Tidal Inlets," Aug. 1974.

Keywords: *Tidal inlets*

Selected regime equations for stable channel cross-sectional areas are compared to an empirical relationship for stable tidal inlet areas. Using an equivalent steady discharge to represent the tidal flow, good agreement is exhibited between the most generalized regime and a tidal prism versus area formula. Although the controlling hydraulic conditions in each case are distinctly unique, the agreement appears to be more than fortuitous.

R 11-74 . . . . . A010 751

CHESNUTT, C.B., and GALVIN, C.J., Jr., "Lab Profile and Reflection Changes for $H_o/L_o = 0.02$," June 1974.

Keywords: *Movable-bed modeling, Profiles*

Wave heights in movable-bed coastal engineering laboratory experiments vary both in space and in time, as illustrated in this paper. Such variability is common over the constant depth section of wave tanks with movable beds.

R 12-74 . . . . . A010 752

EVERTS, C.H., DeWALL, A.E., and CZERNIAK, M.T., "Behavior of Beach Fill at Atlantic City, New Jersey," June 1974.

Keywords: *Atlantic City, New Jersey, Beach nourishment*

A beach-monitoring program between 1962 and 1972 at Atlantic City, New Jersey, was designed to observe the response of beaches to waves and tides of specific intensity and duration as a first step in developing a storm-warning system for low-lying coastal communities. The behavior of beach sand following two beach replenishment projects in 1963 and 1970 was also determined.

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R 13-74 . . . . . A010 753

JAMES, W.R., "Beach Fill Stability and Borrow Material Texture," June 1974.

Keywords: *Beach nourishment, Sediments*

The dependence of beach-fill stability on the textural properties of borrow material requires development of quantitative methods for use in the selection of borrow areas and in the prediction of possible maintenance costs associated with periodic renourishment. If a shore segment is viewed as a sediment mass transfer system, where grains of different sizes have different transport rates, then termination of natural sediment input to the shore segment will cause the beach to retreat and the materials in the active zone will become coarser. The ratio of retreat rates associated with a given borrow material texture to that associated with native material can be used in optimizing economic factors involved in selecting potential borrow zones.

R 1-75* A009 387

SAVILLE, T., Jr., WEGGEL, J.R., and FUSCH, K.E., "The Coastal Engineering Research Center," Dec. 1975.

Keywords: *CERC*

This paper describes CERC's research mission and testing facilities. Research is conducted in five general areas: wave and water level characteristics; sediment transport, erosion, and shoaling; functional and engineering design of coastal projects, including their effects on the physical and biological environments; and, through ecological engineering, the mitigation or enhancement of these effects; and the translation of the results into a usable form.

R 2-75 . . . . . A009 388

WILLIAMS, S.J., and DUANE, D.B., "Construction in the Coastal Zone: A Potential Use of Waste Material," Aug. 1975.

Keywords: *Artificial island, New York Bight, Spoil disposal*

The Inner New York Bight, at the head of the Hudson shelf channel, has been the site for ocean disposal of various waste products since 1888. This paper reports that large volumes of waste materials are available from the ocean bottom in the New York Bight area for construction purposes. This material may be available at a potentially lower unit cost and with possible environmental benefits.

R 3-75* A018 502

CHESNUTT, C.B., "Laboratory Effects in Coastal Movable-Bed Models," Dec. 1975.

Keywords: *Movable-bed modeling*

Both scale and laboratory effects can hinder attempts to solve coastal engineering problems with movable-bed models. Scale effects are the undesired differences between laboratory and prototype conditions caused by the practical impossibility of simultaneously modeling in the laboratory all the forces acting in the prototype. For example, it is impossible to model both the Froude and Reynolds numbers. Laboratory

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effects are the undesired differences between laboratory and prototype conditions caused by the physical constraints which exist in the laboratory, but not in the field. This paper discusses differences in movable-bed coastal model results and laboratory effects, due to varying the initial profile slope, the initial test length (distance from the wave generator to the initial SWL intercept), and the water temperature.

R 4-75* A018 511

COLLINS, J.I., and CHESNUTT, C.B., "Tests on the Equilibrium Profiles of Model Beaches and the Effects of Grain Shape and Size Distribution," Dec. 1975.

Keywords: *Equilibrium profiles, Movable-bed modeling, Profiles, Sediments*

Noda proposed a two-dimensional coastal movable-bed scale-model relationship with four basic scale ratios: horizontal scale, vertical scale, sediment-size ratio, and relative specific weight ratio. This study was conducted to investigate the effects of the model sediment-size distribution and particle shape in movable-bed models. An experimental evaluation of the scale model relationship was also given.

R 76-1* A029 725

EVERTS, C.H., "Shoaling Rate Prediction Using A Sedimentation Tank," June 1976.

Keywords: *Sedimentation tank, Sediments, Shoaling rates*

A sedimentation tank was placed on a tidal flat near Anchorage, Alaska, as an in situ instrument to obtain the shoaling rate that would be expected in an enclosed harbor. A foreknowledge of the shoaling rate is necessary to predict future harbor maintenance expenses. The study evaluates the sedimentation tank as an instrument to measure the shoaling potential of a region in or adjacent to an estuary.

R 76-2* A029 726

AHRENS, J.P., and McCARTNEY, B.L., "Wave Period Effect on the Stability of Riprap," June 1976.

Keywords: *Riprap, Riprap stability*

Test data on the stability of dumped quarrystone riprap to wave attack are presented and analyzed. The tests were conducted in the large two-dimensional wave tank at CERC at near-prototype scale. The test data show riprap stability changes with wave period with the lowest stability occurring at a period that creates a collapsing breaker. Methods to predict riprap stability and wave runup on riprap are developed and discussed.

R 76-3* A029 739

TELEKI, P.G., MUSIALOWSKI, F.R., and PRINS, D.A., "Data Acquisition Methods for Coastal Currents," June 1976.

Keywords: *Currents, Data collection, Instrumentation*

Design criteria for the type and location of coastal engineering structures depend heavily on the understanding of nearshore processes and the evaluation of the ranges of significant parameters such as waves, currents, and sediment transport. Gaging of these

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parameters, in and around the zone of breaking waves, has been difficult because of the lack of rugged implements and instruments, mobility, and adequate experimental designs. In answer to some of the previous shortcomings, a Towed Oceanographic Data Acquisition System (TODAS) has been developed for the collection of nearshore current and wave data.

R 76-4* A029 740

KIESLICH, J.M., and MASON, C., "Channel Entrance Response to Jetty Construction," June 1976.

Keywords: *Jetties, Tidal inlets*

This paper documents a general trend in response of U.S. tidal inlets to construction of single jetties, and is intended to aid in improving rational design of inlets and inlet structures.

R 76-5 . . . . . A033 810

CALLENDER, G.W., Jr., "Geotechnical Engineering in the Coastal Zone," Sept. 1976.

Keywords: *Geotechnical engineering*

Ninety percent of all marine construction takes place in water less than 50 meters deep. The geotechnical engineering aspect of this construction, and of coastal zone sediments in general, has a significant problem potential for designers and individuals and agencies charged with regulating coastal zone activities in the public interest. The U.S. Army, Corps of Engineers is one of the Federal agencies concerned with the coastal zone. Several Corps research organizations, particularly CERC, support this effort. Under its mandate to plan, conduct, and publish the results of coastal engineering research as a source of scientific and engineering data and design methods for use by the Corps, CERC has begun reorienting part of its research program to better support Corps Divisions and Districts in dealing with geotechnical engineering problems.

R 77-1 . . . . . A035 667

EVERTS, C.H., "Sedimentation in a Half-Tide Harbor," Feb. 1977.

Keywords: *Dillingham, Alaska, Half-tide harbor, Sedimentation, Shoaling*

Harbor shoaling becomes a significant problem when coastal waters are laden with suspended solids and the tidal range is high. Because of currents resulting from the tides and severe ice conditions which exist along much of the Alaskan coast, some small-craft harbors are constructed as enclosed basins sited adjacent to, rather than within navigable estuaries. Determination of the shoaling rate and relative importance of factors involved in the shoaling process is essential to the effective design of these harbors. This report describes the history and processes of shoaling observed during the ice-free season at an enclosed small-craft harbor at Dillingham, Alaska, since its construction in 1961. Results of a study of the shoaling process during the winter ice-cover season at Dillingham Harbor are also presented.

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R 77-2 . . . . . A036 679

SAVILLE, T., Jr., "Application of Wave Climatology and Data for Design," Mar. 1977.

Keywords: *Wave climatology*

This paper discusses the importance of wave data for coastal engineering considerations and points out some of the types of application. The following topics are discussed: (a) Difficulties in gathering data, (b) definition and analysis of data, (c) determination of what is needed, and (d) application of the data to design and prediction.

R 77-3 . . . . . A039 101

JAMES, W.R., and HALLERMEIER, R.J., "Nearshore Wave Direction Gage," Apr. 1977.

Keywords: *Instrumentation, Wave gages*

The distribution of incident wave energy density with frequency and propagation direction is important in ocean and coastal engineering problems. For example, incident wave height, period, and direction together govern onshore-offshore and longshore sediment transport in the available treatments. Records from several types of water level sensors have been used to measure the distribution of wave energy density with frequency, but techniques for wave direction measurement still require development. This paper presents research exploring a suggestion that wave runup onto a vertical cylinder might be used to measure wave direction, because of the runups symmetry about wave direction.

R 77-4 . . . . . A038 704

HALLERMEIER, R.J., "Nonlinear Flow of Wave Crests Past a Thin Pile," Apr. 1977.

Keywords: *Piles, Wave transformation*

This paper gives data from laboratory experiments designed to investigate surface wave transformation at a thin, circular vertical pile (with diameter 2_a, much less than a wavelength, L). These data establish the nature of a nonlinear wave crest transformation and the range of variation in peak water level around the pile caused by one crest.

R 77-5 . . . . . A040 508

NAKATO, T., et al., "Wave Entrainment of Sediment from Rippled Beds," May 1977.

Keywords: *Bed forms, Sediments, Waves*

Water wave-induced motion of sand and other sediments is a topic of great practical importance to coastal engineers because of its central role in the transport of sediment in littoral zones. The objective of the primarily experimental investigation reported here was to examine and elucidate the mechanism of sediment suspension from rippled sediment beds by periodic fluid motion. The study was carried out in an oscillatory-flow tunnel that was especially designed and built to facilitate the use of modern techniques for the simultaneous measurement of suspended-sediment concentration and velocity. The instrumentation utilized included an IBM 1801 Data Acquisition and Control System, an electro-optical system for measurement of suspended sediment, and a hot-wire anemometer.

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R 77-6 . . . . . A042 473

BRUNO, R.O., and GABLE, C.G., "Longshore Transport at a Total Littoral Barrier," July 1977.

Keywords: *Channel Islands, California, Sediment transport*

The relation between longshore material transport and nearshore wave thrust (energy) is of vital interest to coastal engineers concerned with design and maintenance of navigation and beach erosion control projects. Past field and laboratory studies have produced an empirical relationship now widely used. However, these studies were conducted in areas where total transport may not have been measured. In this study, Channel Islands Harbor, California, was selected because an offshore breakwater and jetties form a unique sand trap. This site is considered a nearly total littoral barrier to longshore transport. The objective of this study is to reevaluate the empirical relationship between nearshore wave thrust and longshore material transport.

R 77-7 . . . . . A042 678

WEGGEL, J.R., "Wave Overtopping Equation," July 1977.

Keywords: *Wave overtopping, Wave runup, Waves*

This paper evaluates existing wave overtopping data, reanalyzes it, and derives an empirical expression in dimensionless form. The effect of model scale on the test results is also investigated.

R 78-1 . . . . . A051 570

SCHNEIDER, C., "Visual Surf Observations/Marineland Experiment," Feb. 1978.

Keywords *Currents, LEO, Marineland, Florida, Waves, Wind*

During November-December 1975, a complex research experiment was conducted at Marineland, Florida. The experiment was sponsored by the National Aeronautics and Space Administration (NASA) and the Jet Propulsion Laboratory (JPL), and was designed to test instrumentation that will be used on board the SEASAT–A satellite to be launched in 1978. As a part of this larger SEASAT–A experiment, it was decided to obtain wave and nearshore current data collected in accordance with techniques developed under the Littoral Environment Observation Program (LEO). This paper reports on results from this data collection effort.

R 78-2* A051 571

KNUTSON, P.L., "Designing for Bank Erosion Control with Vegetation," Feb. 1978.

Keywords: *Erosion, Vegetation*

Marsh plants are effective in stabilizing eroding banks in sheltered coastal areas. Exceptional results have been achieved in a variety of intertidal environments at a fraction of the cost required for comparable structural protection. Techniques are available for the efficient propagation of several marsh plants for use in bank stabilization. This paper provides design criteria for (1) determining site suitability, (2) selecting plant materials and planting methods, and (3) estimating labor requirements on a project basis.

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R 78-3 . . . . . A051 572

JARRETT, J.T., "Sediment Budget Analysis, Wrightsville Beach to Kure Beach, N.C.," Feb. 1978.

Keywords: *Longshore energy flux, North Carolina, Sediment budget, Sediment transport, Wave refraction*

Littoral transport rates and inlet bypassing quantities were estimated for a 19-mile (30.6 kilometers) segment of the North Carolina coast extending from Wrightsville Beach southward to Kure Beach, by adopting a sediment budget approach. The steps involved in the sediment budget analysis were: (a) an estimate of volumetric changes along the shorelines and in the inlets, (b) wave refraction analysis to determine the distribution of longshore wave energy flux along the shoreline, and (c) a correlation of the volume changes with the computed longshore energy flux distribution. The base period used for this analysis was from 1966 to 1974. After the material transport rates were determined, an evaluation was made of the changes in shore processes resulting from man-induced alterations in the shoreline configuration.

R 78-4 . . . . . A051 573

DEWALL, A.E., and RICHTER, J.J., "Beach and Nearshore Processes in Southeastern Florida," Feb. 1978.

Keywords: *Beach Evaluation Program–CERC, Boca Raton, Hollywood, Jupiter, Florida, LEO, Profiles, Sediment transport, Waves*

From January 1969 to June 1973 Florida Ocean Sciences Institute, Inc. (FOSI) collected data on beach changes and littoral processes at three southeastern Florida coastal localities, under contract with the U.S. Army Coastal Engineering Research Center (CERC). The study was carried out as part of CERC's Beach Evaluation Program (BEP). The study was conducted to accumulate, in a systematic fashion, information regarding winds, waves, and currents in the nearshore environment; and to relate these factors to observed changes in beach profiles along Florida's southwestern coast. A total of 4,898 beach profile surveys and 1,560 littoral environment observations were collected at the beaches of Jupiter, Boca Raton, and Hollywood, Florida.

R 78-5 . . . . . A051 574

GILES, M.L., "Evaluation of a Concrete Building Block Revetment," Feb. 1978.

Keywords: *Armor units, Concrete blocks, Revetments*

This paper presents the results of a two-dimensional laboratory evaluation of a beach revetment plan that uses common concrete building blocks as the revetment armor unit. This type of revetment is appropriate for use along semiprotected shorelines on bays, reservoirs, lakes, and other areas exposed to low to moderate wave attack. The research was conducted at prototype scale in the two-dimensional large wave tank (LWT) facility at the U.S. Army Coastal Engineering Research Center (CERC), Fort Belvoir, Virginia.

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R 78-6 . . . . . A051 575

SCHWARTZ, R.K., and MUSIALOWSKI, F.R., "Nearshore Disposal: Onshore Sediment Transport," Feb. 1978.

Keywords: *Beach nourishment, Dredging, New River Inlet, North Carolina, Profiles, Sediment transport*

New dredge-disposal techniques may serve the dual role of aiding: (1) sand bypassing across coastal inlets, and (2) beach nourishment provided that dredged sediments placed seaward of the surf zone move shoreward into that zone. During summer 1976, 26,750 cubic meters of relatively coarse sediment was dredged from New River Inlet, North Carolina, moved downcoast using a split hull barge, and placed in a 215-meter coastal reach between the 2- and 4-meter depth contours. Bathymetric changes on the disposal piles and in the adjacent beach-nearshore area were studied for a 13-week period to determine the modification of the surrounding beach-nearshore profile and the net transport direction of the disposal sediment.

R 78-7 . . . . . A051 576

HANDS, E.B., "Implications of Submergence for Coastal Engineers," Feb. 1978.

Keywords: *Lake levels, Lake Michigan, Submergence*

Submergence affects most U.S. shorelines and has created serious problems in many localities by increasing flooding, accelerating erosion, altering surface drainage, and causing structural damage. This paper presents selected examples illustrating the problems engineers face in areas of coastal submergence and to discuss in general how sea level changes affect long-term shore processes.

R 78-8 . . . . . A051 577

BRUNO, R.O., WATTS, G.M., and GABLE, C., "Sediments Impounded by an Offshore Breakwater," Feb. 1978.

Keywords: *Breakwaters, Channel Islands, California, Sediment transport*

The breakwater and entrance jetties for the Channel Islands Harbor in California form a total littoral barrier to longshore sand transport. The sand impounded by these structures was monitored by repetitive bathymetric surveys and systematic surface sand sampling. This paper discusses patterns of sediment deposition behind an offshore breakwater. Data collected were studied to determine if the deposition observed agrees with that predicted before construction. Both the geometry and size distribution of the deposition sediment are examined.

R 78-9 . . . . . A051 578

EVERTS, C.H., and CZERNIAK, M.T., "Spatial and Temporal Changes in New Jersey Beaches," Feb. 1978.

Keywords: *Beach Evaluation Program–CERC, Long Beach Island, Ludlum Island, New Jersey, Profiles, Storms*

As part of a long-term study of beach characteristics made under the CERC Beach Evaluation Program (BEP), more than 4,400 beach profiles were obtained at 48

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locations on three New Jersey barrier islands over a 10-year study period. The data represent a rare record of beach changes over a long survey period and over a long stretch of beach. Consequently, they provide a unique opportunity to investigate beach changes as a function of their spatial and temporal qualities. Using 4,400 beach profiles as a data base, average shoreline position and beach volume changes were computed and are presented in this paper. Although the data include beach changes only above the mean sea level elevation, and the results are site-specific with regard to the magnitude of the beach changes, they provide valuable insight into the long-term characteristics of sandy ocean beaches.

R 78-10 . . . . . A051 579

HOBSON, R.D., "Sediment Handling and Beach Fill Design," Feb. 1978.

Keywords: *Beach nourishment, Dredging, New River Inlet, North Carolina, Rockaway Beach, New York*

Beach nourishment is one engineering solution for protecting coastal regions from the effects of long-term erosion and from short-term erosive damage caused by specific storms or hurricanes. It is also a fairly popular shore protection solution in the United States because nourishment tends to maintain the aesthetics and enhance the recreational character of an area, plus the Federal Government provides substantial funding support for many of these projects. Today, fill sediments are often "borrowed" from offshore areas. This paper presents results, to date, of an ongoing effort to quantify and predict sediment losses associated with the nourishment of beaches from offshore borrow sources.

R 78-11 . . . . . A051 796

HANDS, E.B., "Some Data Points on Shoreline Retreat Attributable to Coastal Subsidence," Mar. 1978.

Keywords: *Lake levels, Lake Michigan, Profiles, Submergence*

Coastal subsidence increases flooding in low-lying coastal regions. Moreover, it disturbs the equilibrium profile and allows waves to erode bluffs formerly above the reach of wave uprush. Ensuing adjustment of the profile drives the shoreline farther landward. Guidance is needed for obtaining quantitative estimates of the shore's response. This paper estimates the effects of coastal subsidence using first, data on Lake Michigan shore retreat during 4 years of rapidly rising lake levels; and second, using historic data on the 120-year retreat rates along sections of the lake experiencing different rates or relative subsidence.

R 78-12 . . . . . A062 304

KNUTSON, P.L., "Planting Guidelines for Dune Creation and Stabilization," Nov. 1978.

Keywords: *Beach grass, Dunes, Fertilizers, Sand fences, Vegetation*

This paper provides guidelines for creating and stabilizing foredunes with vegetation. The guidelines are based on more than two decades of field studies conducted by the

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U.S. Army Coastal Engineering Research Center and others. Specific information is given on recommended plant species, planting techniques, fertilization rates, labor requirements, and expected dune growth rates.

R 78-13 . . . . . A061 439

ECKERT, J.W., "Design of Retention Structures for Marsh Habitats," Nov. 1978.

Keywords: *Dikes, Dredge spoil, Spoil disposal*

In years past all materials discharged from a dredge were termed spoil, a substance whose major value was for landfills. However, in the last 20 years the number of acceptable landfill disposal sites has dwindled, making the disposal of dredge spoil a major problem. One of the specific goals of the resulting research program established by the U.S. Army Engineer Waterways Experiment Station's (WES) Dredged Material Research Program (DMRP) was to develop, test, and evaluate new concepts for marsh development. In achieving this goal the Coastal Engineering Research Center (CERC) has assisted WES by evaluating potential in-water containment structures for marsh creation using dredged material, and the parameters to which they must be designed. This paper is a discussion of the parameters used in selecting and designing a retaining or protective structure and a look at the two structural types most used to date.

R 78-14 . . . . . A062 302

JOHNSON, G.F., et al., "Ecological Effects of an Artificial Island," Nov. 1978.

Keywords: *Artificial island, Benthos, Fish, Rincon Island*

The armor rock revetments of Rincon Island represent a significant addition of solid substratum to the local nearshore marine environment which has contributed to an enhancement in the richness of local marine communities. No comprehensive delineation of major habitats nor detailed characterization of communities extant at any one time or on a seasonal basis have been accomplished. This study was undertaken with the recognition that this information would be of value in furthering understanding of ecological consequences of construction of artificial islands in the coastal environment.

R 79-1 . . . . . A067 491

WILLIAMS, S.J., "Geologic Effects of Ocean Dumping on the New York Bight Inner Shelf," Mar. 1979

Keywords: *Geomorphology, New York Bight, Seismic profiles, Waste disposal*

High-resolution seismic reflection records, sediment cores and deep borings, and comparison of bathymetric charts from 1845 to 1973 provide evidence that ocean dumping of assorted solid materials has significantly filled parts of the Hudson shelf channel, and is an important geologic process. Ocean disposal of natural and man-made wastes was officially initiated seaward of New York Harbor in 1888 to relieve health problems, congestion and accelerated shoaling of navigation channels long associated with uncontrolled disposal within the city and adjacent waterways. Records show that about 850 million cubic meters of liquid and solid wastes have been dumped in the

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past 85 years. This paper examines the physical character of the New York Bight presently and during the past almost nine decades to decipher the geologic and long-lasting effects that dumping has had on the Inner Continental Shelf area seaward of New York City.

R 79-2 . . . . . A070 554

BIRKEMEIER, W.A., "The Effects of the 19 December 1977 Coastal Storm on Beaches in North Carolina and New Jersey," June 1979.

Keywords: *Currents, Dare County, North Carolina, Data collection, New Jersey–Long Beach Island and Ludlam Island, Profiles, Storms, Waves*

In 1975, a field-oriented project was initiated to study coastal storms and to predict their effects. The fieldwork concentrated on isolating the effects of individual storms through prestorm and poststorm beach surveying and observations during the storm. This report discusses the results of a significant coastal storm which occurred 19 December 1977 along the east coast of the United States. The effect of the storm was monitored at three localities–Long Beach Island, New Jersey, Ludlam Island, New Jersey, and Dare County, North Carolina.

R 79-3 . . . . . A073 276

EVERTS, C.H., "Beach Behavior in the Vicinity of Groins–Two New Jersey Field Examples," Aug. 1979.

Keywords: *Groins, New Jersey–Cape May and Sea Isle City, Sediment transport*

This paper discusses the behavior of beaches within and adjacent to groin systems located at Sea Isle City and Cape May, along the southern shore of New Jersey. Downdrift erosion prevails at each location, but beach behavior within and updrift of the groin systems is dissimilar.

R 79-4 . . . . . A073 277

HURME, A.K., "Rubble-Mound Structures as Artificial Reefs," Aug. 1979.

Keywords: *Artificial reefs, Breakwaters, Rincon Island, California, Rubble-mound breakwaters*

Corps of Engineers rubble-mound structures are ideal artificial reefs because they are build of natural stone and have many varying sized cracks and crevices exposed to the entire water column so they can be colonized by the greatest diversity of reef dwellers. They are marked to aid navigation and do not consititute a hazard to commercial fishing.

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R 79-5 . . . . . A073 302

WEGGEL, J.R., ROBERTS, J., and HAGAR, J., "Wave Action on the Savannah Tide Gates," Aug. 1979.

Keywords: *Georgia—Back River, Front River, and Savannah, Tide gates, Tides, Wave forces*

The Savannah River at Savannah, Georgia, is divided into two channels by Hutchinson Island. The Front River, relatively narrow and deep, serves as a navigation channel for waterborne commerce. In contrast, the Back River is broad and shallow and not suitable for navigation. To minimize the need for maintenance dredging in the Front River navigation channel, the U.S. Army Engineer District, Savannah, constructed a series of 14 tide gates in a tide-gate structure across the Back River.This paper discusses computations made to evaluate the effect of wind-generated water waves on the motion of the gates and on the resulting forces in the gate pivots and in the hydraulic cylinders.

R 79-6 . . . . . A073 313

PERLIN, M., "Predicting Beach Planforms in the Lee of a Breakwater," Aug. 1979.

Keywords: *Breakwaters, Mathematical models, Wave diffraction, Wave refraction*

A numerical model is presented which predicts beach planforms in the lee of detached offshore breakwaters. The method of solution is a one-line implicit finite-difference scheme. Both diffraction and refraction are taken into account. Simulations of three physical models of breakwaters are presented. Dimensionless, theoretical situations are also investigated.

R 79-7 . . . . . A074 643

FIELD, M.E., et al., "Upper Quaternary Peat Deposits on the Atlantic Inner Shelf of the United States," Sept. 1979.

Keywords: *Atlantic coast, Geology, Inner Continental Shelf, Peat deposits, Radiocarbon dates*

Twenty-one upper Quaternary peat samples were obtained from vibracores collected along the Inner Continental Shelf of the Atlantic coast of the United States. Radiocarbon ages and pollen identifications from the peats, coupled with those from onshore borings and published data, provide additional information on the latest history of the Atlantic shelf. The radiocarbon ages cluster in two groups: early and middle Holocene time (10,000 to 5,000 B.P.) and late Pleistocene time (35,000 to 20,000 B.P.).

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R 79-8 . . . . . A077 230

MATTIE, M.G., and HARRIS, D.L., "The Use of Imaging Radar in Studying Ocean Waves," Nov. 1979.

Keywords: *Aerial photography, Radar, Waves*

This paper gives examples showing that it is often possible to obtain useful images of the nearshore ocean wave field with X-band based radar. The physical principles involved in the use of radar to image the wave field have been simply described. A comparison of wave direction, wavelength and period estimates obtained with the surface-based radar and similar data obtained by other more expensive means shows that the information obtained with radar is comparable in quality with similar data obtained by other means. Practical procedures for overcoming some of the more mundane technical difficulties associated with routine data collection are discussed.

R 79-9 . . . . . A077 228

HOBSON, R.D., and JAMES, W.R., "Importance of Handling Losses to Beach Fill Design," Nov. 1979.

Keywords: *Beach nourishment, New River Inlet, North Carolina, Rockaway Beach, New York, Shore protection*

Beach nourishment models, commonly employed by the U.S. Army Corps of Engineers, compare textural properties of native beach and dissimilar borrow sediments to determine overfill and renourishment requirements for beach-fill projects. It has been assumed that the texture of borrow sediments is unchanged by dredging and handling operations, but investigations have shown that significant handling losses do occur. This paper presents results from four field studies documenting textural changes caused by dredging and sediment handling at Rockaway Beach, New York, and at New River Inlet, North Carolina.

R 79-10 . . . . . A077 231

SEELIG, W.N., and SORENSEN, R.M., "Numerical Model Investigation of Selected Tidal Inlet-Bay System Characteristics," Nov. 1979.

Keywords: *Mathematical models, Sediment transport, Tidal inlets*

A spatially integrated one-dimensional numerical model of inlet-bay hydraulics was combined with a simple sediment transport model to investigate selected tidal inlet-bay system characteristics. A parametric study was performed using the models to determine the effect of various factors on the net direction and order of magnitude of inlet channel flow and sediment transport. Factors considered include astronomical tide type, storm surge height and duration, variation in bay surface area, time-dependent channel friction factor, and the addition of a second inlet connecting the bay and sea.

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R 79-11 . . . . . A077 232

HALLERMEIER, R.J., "Uses for a Calculated Limit Depth to Beach Erosion," Nov. 1979.

Keywords: *Erosion, Sediment transport, Sediments, Shoaling*

A sediment entrainment parameter is used to calculate maximum water depth for intense bed agitation by shoaling linear waves of given height and period. Calculated limit depths agree with available laboratory measurements of water depth at an erosive wave cut into slopes of quartz and other fine sediments. On natural seasonal beaches, available measurements of seaward limit to appreciable sand level changes agree with limit depths calculated for extremely high waves expected 12 hours per year. The apparent accuracy and lack of scale effect in the calculated limit depth justify several applications in field and laboratory projects.

R 79-12 . . . . . A077 269

MASON, C., "The Coastal Engineering Research Center's Field Research Facility at Duck, North Carolina," Nov. 1979.

Keywords: *Duck, North Carolina, Field Research Facility–CERC, Piers*

In August 1977, construction of the 1,800-foot pier was completed on the Outer Banks of North Carolina. This paper discusses the purpose of this effort; the physical characteristics of the site; the status of the facility; and related data collection, analysis and display capabilities. Scientific projects underway and planned for the facility are also discussed.

R 79-13 . . . . . A077 233

VITALE, P., "Sand Bed Friction Factors for Oscillatory Flows," Nov. 1979.

Keywords: *Bed forms, Friction factor, Shear stresses*

Oscillatory water tunnel tests, published in TM-28 (1969), are plotted as friction factor versus Reynolds number. These data, for three sand sizes and for both rippled and flat movable beds, are analyzed in a manner analogous to early treatment of flow in rough pipes that produced the Moody diagram. Laminar, transitional, and turbulent regimes are defined.

R 79-14 . . . . . A079 686

PARKER, N.E., "Weir Jetties–Their Continuing Evolution," Jan. 1980.

Keywords: *Harbors, Jetties, Weir jetties*

This paper briefly discusses the concepts of the weir jetty as a bypassing system and a solution to the problem of shoaling harbors. The paper also traces the history of evolution of the weir jetty concept and discusses the successes and failures of existing weir jetty systems in the United States. The paper also discusses the designs of weir jetty bypassing systems which are now under construction or on the drawing board.

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R 80-1 . . . . . .

THOMPSON, E.F., "Shallow Water Surface Wave Elevation Distributions," June 1980.

Keywords: *Gaussian distribution, Wind-generated waves*

Many widely used engineering formulas dealing with wind-generated waves have been derived with the assumption that the distribution of instantaneous sea-surface elevations is described by the Gaussian distribution law. When real wave conditions are not well described by the Gaussian law, the propriety of these formulas and designs based upon these formulas is questionable. The validity of the Gaussian assumption for shallow-water surface wave elevation distributions is examined. A simple test for the non-Gaussain character of real waves is described and applied to U.S. coastal data collected by CERC in water depths of 5 to 9 meters.

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9. TECHNICAL MEMORANDUMS

TM 1* 429 785

BELLY, P.Y., "Sand Movement by Wind," Jan. 1964.

Keywords: *Sediment transport, Sediments, Threshold velocity, Wind, Wind tunnel*

Sand movement by wind is investigated in a laboratory wind tunnel, and results compared with formulas previously developed by other investigators. Findings of previous investigators with respect to rate of sand transport are reaffirmed, but average flying distance of sand particles was found to be much greater, possibly due to method of calculation. Kadib (in Addendum II) extended the investigation to smaller sand particle-size range and indicated threshold velocity is best determined by experiment rather than formula when sand grain size is <0.20 millimeter. The effect of moisture content on sand movement by wind is also investigated; experimental data clearly demonstrate that moisture increases the value of the threshold velocity of sand movement.

TM 2* 440 878

KALKANIS, G., "Transportation of Bed Material Due to Wave Action," Feb. 1964.

Keywords: *Boundary layer flow, Lift forces, Sediment transport*

A method is developed for use in determining rate of sediment transportation in a layer adjacent to the ocean floor. Method is applicable only for conditions of unstable flow in this layer associated with long surface waves of small amplitude where it is assumed sediment particles in a bed are brought to a state of incipient equilibrium. By experimental determination of the distribution of lift forces and statistical analysis of turbulent fluctuations, an equation for the rate at which sediment in the bed layer is oscillated and an expression for concentration of sediment in this oscillatory state are developed. The concentration in combination with velocity distribution in bed layer associated with any incidental secondary flow can be used to calculate transport rate of bed material in direction of the flow.

TM 3* 440 879

EAGLESON, P.S., and van de WATERING, W.P., "A Thermistor Probe for Measuring Particle Orbital Speed in Water Waves," Mar. 1964.

Keywords: *Current meters, Instrumentation, Orbital velocity meters, Thermistor*

The development of a thermistor probe and the necessary additional electronic circuitry to measure temporal and spatial distribution of the magnitude of the orbital velocity vector in water waves is described. Considerations are presented which govern the choice of the thermistor and circuitry according to the proposed use of the probe. A steady-state calibration by towing the probe through a still body of water is shown to be adequate for indicating velocities in unsteady motion of a water wave for a frequency up to 0.5 cycle per second. Orbital velocities of laboratory waves measured with the instrument are compared with those predicted by Stokes' theory.

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TM 4* 440 880

GALVIN, C.J., Jr., "Wave-Height Prediction for Wave Generators in Shallow Water," Mar. 1964.

Keywords: *Wave generators, Wave heights*

A simple method of computing wave heights generated by displacement-type mechanical wave generators in shallow water based on approximate theory is presented. It is shown that the height of waves generated is approximately equal to $2\pi S/L$ times an appropriate linear dimension of the generator measured normal to the stroke S. This relation is shown to agree with hydrodynamic theory for piston and flap-type generators and with actual measured data from four piston-type and two plunger-type generators of widely different character, for the range of relative depth usually encountered in laboratory practice, $2\pi d/L < 1$.

TM 5* 440 881

HARRISON, W., BREHMER, M.L., and STONE, R.B., "Nearshore Tidal and Non-Tidal Currents, Virginia Beach, Virginia," Apr. 1964.

Keywords: *Current meters, Diffusion, Tidal currents, Virginia Beach, Virginia*

Simultaneous measurements by Eulerian and Lagrangian methods were made continuously during a 1-week period in the nearshore area south of Cape Henry. Three Roberts Radio Current Meter stations were also established offshore, and five onshore stations were established for longshore current and wave measurement. These data are presented and a circulation model constructed which confirms earlier speculation that nontidal drift describes a clockwise eddy movement south of Cape Henry, the southern limit of which is apparently near Rudee Inlet. Diffusion was investigated in one of the tidal currents during ebb flow by tagging with rhodamine-B dye, and specific information thereon is also presented.

TM 6* 453 226

HARRISON, W., and WILSON, W.S., "Development of a Method for Numerical Calculation of Wave Refraction," Oct. 1964.

Keywords: *Hindcasting, Virginia Beach, Virginia, Wave refraction*

A procedure is described for calculation of wave refraction using observed or hindcast deepwater wave characteristics, and high speed computer programs. An example of the method is presented in which wave rays are brought from deep water in the Atlantic Ocean to the shore at Virginia Beach, Virginia. The method is in the developmental stage but promises rapid and accurate calculation for routine determinations.

TM 7* 459 084

HARRISON, W., and KRUMBEIN, W.C., "Interactions of the Beach-Ocean-Atmosphere System at Virginia Beach, Virginia," Dec. 1964.

Keywords: *Beach geometry, Computers, Sediments, Tidal currents, Virginia Beach, Virginia, Wind*

A number of interactions among beach variables are investigated by sequential linear multiregression analysis as programed for high speed computers. Study includes

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influence of beach geometry, wave characteristics, tidal effects, and local wind conditions on velocity of longshore currents, deposition and erosion on the lower foreshore, and response of grain size and beach slope to shore processes. Most influential combinations of variables arbitrarily designated as "process" variables are in general agreement with significant variables of wave tank experimentation, and substantiate intuitive judgments regarding relative importance of these variables on natural beaches. Results suggest the study of certain additional variables, seldom examined under controlled conditions, combined with variables normally examined in wave tanks is needed. Timelag between inception of a group of "processes" and moment of their maximum effect on the "response" is also investigated.

TM 8* **459 085**

HARRISON, W., KRUMBEIN, W.C., and WILSON, W., "Sedimentation at an Inlet Entrance–Rudee Inlet-Virginia Beach, Virginia," Dec. 1964.

Keywords: *Currents, Virginia–Rudee Inlet and Virginia Beach, Tidal inlets*

A physical model is presented of the wave, longshore-current and ebbtide current systems as the distribution of mean particle size and degree of sorting at the mouth of a controlled inlet are determined. Bottom samples taken at Rudee Inlet, Virginia Beach, Virginia, were subjected to trend-surface analysis to verify trends predicted by model. Correspondence between model and natural situation was good, but area of inlet-current influence was rather limited in extent.

TM 9* **459 520**

HARRISON, W., and ALAMO, R.M., "Dynamic Properties of Immersed Sand at Virginia Beach, Virginia," Dec. 1964.

Keywords: *Sediments, Settling velocities, Virginia Beach, Virginia*

Results are presented for a study designed to measure and analyze systematic variations in mean settling velocity of a large number of sand samples taken simultaneously along three transects across the beach and in the vicinity of Rudee Inlet. Measurements used to describe properties of the samples were: mean settling velocity, mean Reynolds number, and mean drag coefficient. Corey's shape factor and dynamic shape factor of Briggs, McCulluch, and Moser (1962) were calculated and compared. The importance of kinematic viscosity on dynamic properties of sand particles and on beach slopes in shoaling wave zone is considered. Observed trends of mean size and sorting throughout the dynamic zones are compared with those predicted by the Miller and Ziegler (1965) model, but comparison is poor.

TM 10* **615 790**

GALVIN, C.J., Jr., and EAGLESON, P.S., "Experimental Study of Longshore Currents on a Plane Beach," Jan. 1965.

Keywords: *Currents, Sediment transport*

This investigation deals with experimental description of longshore currents and analytical prediction of longshore current velocity. The experimental phase includes

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measurements, under controlled laboratory conditions, of phenomena associated with longshore currents flowing on a smooth plane beach. The analytical phase includes development of an empirical relation between longshore current velocity and wave conditions at breaking, an order of magnitude analysis of energy in the surf zone, and an examination of equations of motion for longshore currents. The empirical relation for predicting approximate value of mean velocity of uniform longshore currents agrees with some sets of field and laboratory data.

TM 11* 615 791

VESPER, W.H., "Behavior of Beach Fill and Borrow Area at Seaside Park, Bridgeport, Connecticut," Feb. 1965.

Keywords: *Beach nourishment, Seaside Park, Connecticut*

Comparative survey and sand-sampling data are analyzed to determine the behavior of beach fill placed on the beach from an offshore borrow source. Over a 5-year period subsequent to initial placement volumetric losses averaging about 14,000 cubic yards per year from the beach zone above MLW are nearly equaled by volumetric gains in the underwater zone of the profile, with only a comparatively small net volume (8,400 cubic yards for the 5-year period) indicated as net loss from the fill area. The borrow area, about 1,200 feet offshore, was concluded to be sufficiently distant to preclude inducement of offshore loss. Annual cost of providing and maintaining the authorized beach protection at Seaside Park is estimated at $3.35 per linear foot of shore.

TM 12* 620 873

NEIHEISEL, J., "Source and Distribution of Sediments at Brunswick Harbor and Vicinity, Georgia," Mar. 1965.

Keywords: *Brunswick Harbor, Georgia, Natural tracers, Sediment transport*

Distribution patterns of bottom sediment in Brunswick Harbor reflect long-term hydrodynamic response and generally correlate with dynamic factors affecting sedimentation. Certain diagnostic minerals reflect the source and are used as "natural tracers" to delineate direction of sediment movement. Analysis of sediment parameters also enables interpretation of sediment transport direction. Results indicate shoaling presently occurring is related to source materials in Altamaha River and is introduced into the harbor through the tidal inlet between the barrier islands and also through MacKay River during greater than average discharge rates of the Altamaha River.

TM 13* 620 874

BORGMAN, L.E., "The Statistical Distribution of Ocean Wave Forces on Vertical Piling," July 1965.

Keywords: *Piles, Wave forces*

Theoretical distribution and relationships concerning wave forces on piling for unidirectional waves of very small amplitude having narrow-band spectrum are investigated mathematically and compared with measured data for finite waves with an almost narrow-band spectrum. The usual force formula consisting of a drag and an

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inertial component, each multiplied by coefficients supposedly constant, is used. A graphical method is presented for estimating parameters defining these forces which permits replacing the distribution of the measured forces with an empirical distribution function adjusted for the condition that only those waves with forces exceeding some significant peak value are included in the measured data.

TM 14* **628 866**

CHERRY, J.S., "Sand Movement Along a Portion of the Northern California Coast," Oct. 1965.

Keywords: *California–Bodega Head, Drakes Bay, Pt. Reyes, and Russian River, Littoral barriers, Sediment transport*

Long-term beach and offshore sand movement along the northern California coast between Drakes Bay and Russian River is studied. Analysis of wave, sand, and geological data, coupled with known configurations and behavioral processes of stable beaches, suggests little net alongshore movement under present conditions and that beaches are generally in equilibrium with negligible loss. This analysis is confirmed through heavy mineral analysis of surface samples. Pt. Reyes and Bodega Head are indicated to be effective littoral barriers to longshore transport.

TM 15* **628 867**

WILSON, B.W., "Analysis of Wave Forces on a 30-inch Diameter Pile Under Confused Sea Conditions," Oct. 1965.

Keywords: *Gulf of Mexico, Piles, Wave forces*

The methods developed in 1955-57 for analysis of wave force measurements on a 30-inch test pile in the Gulf of Mexico are discussed and procedures for reducing raw data to a form suitable for digital computer operations are outlined. Measurements of vertical reaction at the pile supports were successfully checked with the record of water surface fluctuation, n(t), but calculations of total force based on measured horizontal reactions could not be correlated. Identification of separate wave systems suggested an equivalent force, $F_e(t)$, can be used for correlation with velocity and acceleration components derived from n(t), and its use is justified by a pilot analysis of synthetic data. It was found possible by use of this analysis technique to recover the values of drag and inertial coefficients put into the synthetic data.

TM 16* **628 868**

KRUMBEIN, W.C., and JAMES, W.R., "A Lognormal Size Distribution Model for Estimating Stability of Beach Fill Material," Nov. 1965.

Keywords: *Beach nourishment, Critical ratio, Mathematical models, Sediments, Virginia Beach, Virginia*

An analytical approach to the problem of estimating the "extra amount" of beach fill needed when available borrow material is finer than native sand composing the beach area is discussed. A mathematical solution is offered for those cases where borrow material is less well sorted than native beach material. If fill is better sorted,

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there is no direct mathematical solution and required fill quantities must be based on past experience and empirical procedures. Mathematical theory underlying the method of analysis is based on a simple model assuming lognormalcy of particle-size distributions. A "critical ratio" of amount of borrow material needed to produce the size distribution of the native sand is defined such that when the ratio has a maximum, the problem can be solved.

TM 17* **636 771**

WILSON, W.S., "A Method for Calculating and Plotting Surface Wave Rays," Feb. 1966.

Keywords: *Computer programs, Virginia Beach, Virginia, Wave refraction*

A method using a digital computer and incremental plotter for calculating and plotting wave rays (orthogonals) is described. Given grid of depth values, initial position of wave ray, and direction of travel and period of wave, successive points along ray path are calculated. For each point on path, water depth and bottom slope are estimated from depth grid by linear interpolation; wave speed and curvature computed according to classic theory; and location of next successive point approximated by iteration procedure. Numerical results may be plotted automatically. An example of results, obtained by application of method at Virginia Beach, Virginia, is presented. Unless the bathymetry of area is unusually smooth, this method is faster than manual construction. The computer program is included.

TM 18* **647 213**

FAIRCHILD, J.C., "Correlation of Littoral Transport with Wave Energy Along Shores of New York and New Jersey," Nov. 1966.

Keywords: *Sediment transport, Wave energy, Wave refraction*

Discusses the results of a study which correlated field measurements of net littoral transport with the average net alongshore component of wave energy. Employs a survey attempt toward a "wave energy–littoral transport" correlation for a 500-mile stretch of coastline by applying wave refraction analysis to wave hindcasts from synoptic weather charts. Littoral transport rates were obtained from beach erosion control and other applicable reports of the study area. Results are presented in tabular and graphical form and compared to other "wave energy–littoral transport" relationships. The conclusion is made that the correlation should be reliable within the limits of the data scatter.

TM 19* **647 214**

BOWEN, A.J., and INMAN, D.L., "Budget of Littoral Sands in the Vicinity of Point Arguello, California," Dec. 1966.

Keywords: *Point Arguello, California, Sediment budget, Sediment transport*

Discusses the results of a detailed analysis of the littoral processes affecting the California coast between Pismo Beach and Santa Barbara. The method involves the concept of a sand budget based on transport rates of significant littoral processes. Each

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process is examined to assess the sedimentary contributions (credits) and losses (debits). To balance sediment transports, the region is subdivided into five cells, with boundaries at positions where longshore transport of sand has been estimated. Using basic data, a quantitative transport rate was determined for each process in each cell. Results are shown in graphic and tabular form.

TM 20* **655 260**

VESPER, W.H., "Behavior of Beach Fill and Borrow Area at Sherwood Island State Park, Westport, Connecticut," May 1967.

Keywords: *Beach nourishment, Sherwood Island State Park, Connecticut*

In 1957, sand was pumped to the shore from an offshore borrow area to restore and stabilize the beach. Training walls were constructed to confine the inlet at the east end and a groin built at the west end of the park. The entire beach was widened and raised, and an extra amount of sand was placed on Sherwood Point to act as a feeder beach. Surveys in 1962 showed that losses from the tidal zone were major and indicated that further maintenance is required. Data, in graphic form, show comparative beach profiles and changes in shoreline. Quantitative volume changes and sand sample data are presented in tabular form. Initial and annual cost figures are given.

TM 21* **659 334**

KOONTZ, W.A., and INMAN, D.L., "A Multi-Purpose Data Acquisition System for Instrumentation of the Nearshore Environment," Aug. 1967.

Keywords: *Current meters, Suspended sediments, Wave gages*

A data acquisition system, using digital techniques, has been designed and tested. Using modern computer techniques, it acquires and analyzes instantaneous-synoptic measurements of the nearshore environment. Sensors include: a digital wave gage with self-contained logic circuitry; a vibrating-wire transducer to measure bottom pressures; a Savonius current meter; and a photography technique for estimating the density of suspended sediments.

TM 22* **659 341**

WOODHOUSE, W.W., and HANES, R.E., "Dune Stabilization with Vegetation on the Outer Banks of North Carolina," Aug. 1967.

Keywords: *Beach grass, Cape Hatteras, North Carolina, Dunes, Fertilizers, Transplanting*

Shore and nursery experiments were conducted to develop an accelerated and effective vegetation program for "growing" dunes. Randomized blocks of plantings, with three replications, were used in the experiments. Results of various methods of producing nursery stock, transplanting, and fertilization are shown in figures, tables, and photos. The most practical and economical methods for each step of the program are suggested.

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TM 23 . . . . . 662 000

AHRENS, J.P., "A Model Study of the Entrance Channel, Depoe Bay, Oregon," Sept. 1967.

Keywords: *Depoe Bay, Oregon, Harbors, Hydraulic models*

A scale-model study was conducted at CERC to see if a proposed widening of the entrance channel at Depoe Bay, Oregon, would allow appreciably more wave energy to enter the harbor. A linear, undistorted Froude scale of 1 to 120 was used. The model was constructed of mortar in a wave tank 72 feet long and 1.4 feet wide. Ponding in the model bay due to extreme wave action exceeded the equivalent of 5 feet prototype. The wave height transmission coefficient for waves traveling into the bay ranged from greater than 1.0 for long waves to less than 0.1 for short waves.

TM 24* 662 056

BROWN, L.J., and BORGMAN, L.E., "Tables of the Statistical Distribution of Ocean Wave Forces and Methods of Estimating Drag and Mass Coefficients," Oct. 1967.

Keywords: *Drag coefficients, Mass coefficients, Piles, Wave forces*

Reviews the statistical distribution of ocean wave forces based on formulas of earlier investigations. Tables present the probability density and distribution function of wave forces, particularly for use with piles. The tables obviate lengthy computations and are useful in engineering design. Five methods for the estimation of C_D and C_M are given. Wave forces measured near Davenport, California, illustrate the use of the tables and methods. A method of moments is easiest to apply but the least squares methods give more consistent results.

TM 25* 683 491

WILSON, B.W., and TØRUM, A., "The Tsunami of the Alaskan Earthquake, 1964; Engineering Evaluation," May 1968.

Keywords: *Alaska, Earthquakes, Seismic sea waves, Tsunamis*

This report relates the earthquake to the generation, propagation, and dispersion of main tsunami waves, and gives detailed studies of the main tsunami and local seismic sea waves for damaged areas. In addition to the wave analysis for each location, presents an engineering evaluation for severely damaged areas. Includes marigrams of component waves and oscillations for many places. Relates the tsunami waves to local bay and shelf oscillations, and to the local tides.

TM 26* 684 894

BODINE, B.R., "Hurricane Surge Frequency: Estimated for the Gulf Coast of Texas," Feb. 1969.

Keywords: *Hurricanes, Storm surge*

In an investigation of 19 hurricanes of record since 1900, a method was developed for assigning frequencies to water levels of hypothetical hurricanes with various prescribed values of hurricane parameters—central pressure index, forward speed, and radius of maximum winds. A method is also presented for estimating surge frequency in inland bays and adjacent regions subject to flooding by hurricanes. Results are presented in tables and curves.

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TM 27* 690 803

WATKINS, L.L., "Corrosion and Protection of Steel Piling in Seawater," May 1969.

Keywords: *Cathodic protection, Concrete jackets, Piles, Protective coatings*

The report, based on a survey of literature, assembles much of the current knowledge concerning corrosion and protection of steel piling in seawater. Causes of corrosion and effects of environmental conditions are presented. Results of tests on protective coatings for steel are included. Corrosion rates of bare steel piles and the factors involved in the use of cathodic protection and concrete jackets are explained. References surveyed show that flame-sprayed zinc sealed with vinyl is possibly the best coating system tested. More data are needed to determine the most economical method of protecting steel piling in seawater.

TM 28* 693 867

CARSTENS, M.R., NEILSON, F.M., and ALTINBILEK, H.D., "Bed Forms Generated in the Laboratory Under an Oscillatory Flow: Analytical and Experimental Study," June 1969.

Keywords: *Bed forms, Drag coefficients, Dunes, Ripples*

Bed forms in a bed of uniform sand in an oscillatory-flow water tunnel were studied experimentally to determine incipient motion, evolution of a duned bed, geometry of equilibrium dunes, and energy dissipation in the flow over a dune bed. The ratio of dune amplitude to mean particle diameter and the ratio of dune amplitude to dune wavelength were found to be unique functions of a single variable—ratio of water motion amplitude to mean particle diameter. Oscillatory flow over a duned bed and a smooth flat bed was compared with regard to added energy dissipation and results are presented in terms of difference in boundary drag coefficients between the duned and smooth bed.

TM 29* 699 339

DUANE, D.B., and MEISBURGER, E.P., "Geomorphology and Sediments of the Nearshore Continental Shelf, Miami to Palm Beach, Florida," Nov. 1969.

Keywords: *Beach nourishment, Continental Shelf, Florida—Palm Beach and Miami, Geomorphology, ICONS, Sea bottom cores, Sediments, Seismic profiles*

The Continental Shelf off southeast Florida between Palm Beach and Miami was surveyed by CERC to locate and evaluate sand deposits usable for artificial beach nourishment. Survey data covered 141 square miles of that part of the shelf between 15- and 100-foot depths, and consisted of seismic reflection profiles and sediment cores from the sea floor. As beach nourishment, sand-sized sediments from the shelf off southeast Florida are of marginal quality.

TM 30* 701 903

WILLIAMS, L.C., "CERC Wave Gages," Dec. 1969.

Keywords: *Instrumentation, Wave gages*

CERC has used wave gages to gather prototype wave data since 1948. Two basic types of gages are now used in the field—the step-resistance staff gage and the underwater pressure-sensitive gage. CERC has developed three types of staff gages: a

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series type for freshwater, a parallel type for saltwater, and a relay-operated type for use in either freshwater or saltwater where wide changes in salinity occur. The pressure gage, used in water of any salinity, is not as accurate as the step-resistance gages. The report describes each gage and the theory of operation, details of fabrication, steps for calibration and installation, and maintenance requirements.

TM 31* **707 417**

MULTER, R.H., "Measuring Directional Velocity in Water Waves with an Acoustic Flowmeter," Apr. 1970.

Keywords: *Acoustic flowmeter, Instrumentation*

Reports an investigation to adapt an acoustic flowmeter to measure velocities in water waves. The flowmeter was designed to measure difference in traveltimes of two acoustical pulses traveling simultaneously in opposite directions along a common path. Because of viscous effects, a low velocity flow occurs behind each probe, and measured velocity is less than actual velocity when the angle between the acoustical path and velocity vector, θ, is small. When this angle is rather large, the wake has little effect on velocity and, measured velocity equals actual velocity times cos θ. Shows that the wake effect may be eliminated by simultaneous measurements along multiple paths.

TM 32* **715 720**

SOBEY, R.J., "Finite-Difference Schemes Compared for Wave-Deformation Characteristics In Mathematical Modeling of Two-Dimensional Long Wave Propagation," Oct. 1970.

Keywords: *Mathematical models, Storm surge, Tides*

The wave-deformation characteristics of several different schemes for two-dimensional long wave propagation are compared by means of the propagation factor introduced by J.J. Leendertse. The schemes compared are those proposed by N.S. Heaps, R.O. Reid and B.R. Bodine, J.J. Leendertse, and M.B. Abbott, respectively. The study also demonstrates the differing behavior of explicit and implicit schemes.

TM 33* **717 034**

JUDGE, C.W., "Heavy Minerals in Beach and Stream Sediments as Indicators of Shore Processes Between Monterey and Los Angeles, California," Nov. 1970.

Keywords: *California–Pt. Conception and Ventura, Heavy minerals, Sand analysis, Sediment transport*

A study of heavy minerals on the California coast was made at CERC. Beach samples were supplemented by samples from offshore and the rivers. Heavy minerals in the 63- to 125-micrometer fraction of the samples were identified by optical techniques. Five provinces were identified: a north Hornblende, a north Augite, an Epidote, a south Augite, and a south Hornblende. Analyses gave some indication of net littoral transport, but heavy minerals were not definitive indicators of littoral drift from Pt. Conception to Ventura.

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TM 34* 724 135

MEISBURGER, E.P., and DUANE, D.B., "Geomorphology and Sediments of the Inner Continental Shelf, Palm Beach to Cape Kennedy, Florida," Feb. 1971.

Keywords: *Florida–Cape Kennedy and Palm Beach, Geomorphology, ICONS, Sediments, Seismic reflection*

The Inner Continental Shelf off eastern Florida was surveyed to obtain information on bottom morphology and sediments, subbottom structure, and sand deposits suitable for beach fill. Primary survey data consist of seismic reflection profiles and sediment cores. Beach sediment consists of quartzose sand and shell fragments. Median size of midtide samples generally lies in the range of from 0.3- to 0.5-millimeter (1.74 to 1.0 phi) diameter. Shelf area is a submerged sedimentary plain of low relief. Ridgelike shoals resting on the seaward-dipping subbottom strata contain material suitable for beach fill. Minimum volume of 92.2×10^6 cubic yards is available.

TM 35* 728 128

BODINE, B.R., "Storm Surge on the Open Coast: Fundamentals and Simplified Prediction," May 1971.

Keywords: *Chesapeake Bay, Hurricanes, Mathematical models, Storm surge*

A quasi two-dimensional numerical model for open-coast storm surge computations is discussed from the standpoint of underlying assumptions, range of validity, calibration, and application. Elementary aspects of hurricanes and physical factors of storm generation are discussed. The basic hydrodynamic equations are given, together with assumptions made in their development. Equations consistent with the model are reduced forms of basic equations in which several terms have been neglected. Use of design hurricanes for engineering studies is discussed. Effects of tide, initial water level, and atmospheric pressure setup are considered. A problem for the Chesapeake Bay entrance is solved by computer and manually. The program is listed.

TM 36* 732 833

STAFFORD, D.B., "An Aerial Photographic Technique for Beach Erosion Surveys in North Carolina," Oct. 1971.

Keywords: *Aerial photography, North Carolina–Carteret and Onslow Counties*

A procedure was developed to survey coastal erosion by measurements made on aerial photos. Results obtained by using the technique in Onslow and Carteret Counties in North Carolina are presented. The procedure consists of selecting stable reference points on aerial photos taken in different years and measuring between these points and points on the transient beach. The changes in the dune line and the high water line were determined. A special effort was made to reduce the effects of inherent errors in the photos. The procedure was concluded to be applicable to a wide range of coastal conditions, and it has several advantages over alternative data collection methods.

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TM 37 . . . . . 748 414

THOMSEN, A.L., WOHLT, P.E., and HARRISON, A.S., "Riprap Stability on Earth Embankments Tested in Large- and Small-Scale Wave Tanks," June 1972.

Keywords: *Armor units, Glacial boulders, Hydraulic models, Quarrystone, Riprap, Tribars*

Tests of models in wave tanks were made to determine the effectiveness of several riprap designs in protecting embankment slopes from wave action. Models ranging from about 1:20 scale to almost full scale were tested with waves up to about 6 feet high. A range of wave periods was tested; embankment slopes varied from 1 on 2 to 1 on 5. Armor layers were composed of quarrystone, glacial boulders, and tribars. Relationships that define the effect of wave height, wave period, embankment slopes, and Reynolds number on size of stable armor units were experimentally determined, and are given in graphs and tables.

TM 38* 749 545

MEISBURGER, E.P., "Geomorphology and Sediments of the Chesapeake Bay Entrance," June 1972.

Keywords: *Beach nourishment, Chesapeake Bay, Geomorphology, ICONS, Sediments, Seismic reflection*

The Chesapeake Bay entrance and the Atlantic Ocean in the Cape Charles and Cape Henry vicinities were surveyed to study the bottom morphology and sediments and subbottom structure to locate suitable sand deposits for possible shore nourishment. Seismic reflection profiles and sediment cores were the basis for the study. Figures show underwater terrace locations in the inshore, shallow bay, and deepwater areas.

TM 39* 766 721

PARARAS-CARAYANNIS, G., "Ocean Dumping in the New York Bight: An Assessment of Environmental Studies," May 1973.

Keywords: *New York Bight, Spoil disposal*

Short-term studies on effects of ocean dumping in the New York Bight were contracted by CERC. Studies included hydrographic, geological, chemical, and biological investigations; and an electronic sensor survey to detect locations and dump status of waste disposal vessels. Circulation patterns were determined. Chemical analyses of water samples were made and sediment and biological samples were analyzed. Included are studies of marine life, bacteria, and waste disposal. Impacts on ecology and water quality are discussed.

TM 40* 768 791

RHODES, E.G., "Pleistocene-Holocene Sediments Interpreted by Seismic Refraction and Wash-Bore Sampling, Plum Island-Castle Neck, Massachusetts," July 1973.

Keywords: *Geomorphology, Plum Island, Massachusetts, Seismic refraction*

The wash-bore method of soil sampling was found to be an excellent means for subsurface study in coastal areas. Considerations in interpretation of seismic refraction records are (a) the blind zone, (b) the nonzero time intercept, (c) time gaps in the time-distance plots over buried peat, and (d) variable thicknesses of dry sand layers. The seismic method successfully located buried Pleistocene and bedrock topography.

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TM 41 . . . . . 778 733

COURTENAY, W.R., et al., "Ecological Monitoring of Beach Erosion Control Projects, Broward County, Florida, and Adjacent Areas," Feb. 1974.

Keywords: *Beach nourishment, Broward County, Florida, Ecology*

Ecological monitoring of algae, invertebrates, and fishes was conducted along the southeast Florida coast in connection with offshore dredging and beach nourishment projects. One area surveyed showed no adverse ecological effects; reef damage by dredging equipment was found in another area. Ecological data have been recorded for three other areas proposed for dredge and fill operations.

TM 42* 779 513

FIELD, M.E., and DUANE, D.B., "Geomorphology and Sediments of the Inner Continental Shelf, Cape Canaveral, Florida," Mar. 1974.

Keywords: *Beach nourishment, Cape Canaveral, Florida, Geomorphology, ICONS, Sediments*

The Atlantic Inner Continental Shelf off central Florida was surveyed by CERC to obtain data on morphology, structure, and sediments of the sea floor for interpretation of Quaternary history and delineation of sand deposits suitable for beach restoration. Basic survey data consists of 360 miles of seismic reflection profiling and 90 sediment cores from depths of 20 to 90 feet below sea level.

TM 43* 778 740

KEITH, J.M., and SKJEI, R.E., "Engineering and Ecological Evaluation of Artificial-Island Design, Rincon Island, Punta Gorda, California," Mar. 1974.

Keywords: *Armor units, Artificial island, Rincon Island, California, Tetrapods*

Rincon Island is a manmade offshore island composed of armor rock and tetrapod revetments enclosing a sand core. An evaluation after 14 years shows: no damage by waves; littoral transport has been unaffected; little subsidence has occurred; and a thriving community of marine organisms has developed.

TM 44* 785 572

KRUMBEIN, W.C., and JAMES, W.R., "Spatial and Temporal Variations in Geometric and Material Properties of a Natural Beach," June 1974.

Keywords: *Beach characteristics, Pt. Mugu, California*

Maps of beach foreshore properties give spatial continuity to beach observations; repetitive sampling gives the areal patterns with continuity in time. Rapid measurements and data reduction yield real-time data for analyzing beach phenomena in theoretical and applied geological and coastal engineering studies. Mapped properties form an interlocked complex of foreshore responses to ongoing shore processes. The influence of erosion and deposition during successive tidal cycles was examined. Results show difference in some aggregate properties.

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TM 45* 785 577

WILLIAMS, S.J., and DUANE, D.B., "Geomorphology and Sediments of the Inner New York Bight Continental Shelf," July 1974.

Keywords: *Beach nourishment, Continental Shelf, Geomorphology, ICONS, New York Bight, Sediments*

The Inner New York Bight Continental Shelf off northern New Jersey and western Long Island was surveyed to obtain data on morphology, structure, and sediments of the sea floor for interpretation of geologic history and delineation of sand deposits for beach restoration. Basic survey data consist of 445 miles of seismic reflection profiling and 61 vibratory cores. Comparison of bathymetric maps has confirmed that parts of the natural Hudson Channel have been filled from ocean disposal of 1 billion cubic yards of antropogenic materials.

TM 46 . . . . . 002 055

WOODHOUSE, W.W., Jr., SENECA, E.D., and BROOME, S.W., "Propagation of Spartina alterniflora for Substrata Stabilization and Salt Marsh Development," Aug. 1974.

Keywords: *Smooth cordgrass, Spartina alterniflora, Transplanting, Vegetation*

Describes techniques developed for the propagation of *Spartina alterniflora* (smooth cordgrass), in the intertidal zone of dredge spoil and eroding shorelines. Both seeding and transplanting methods were successful. The relationship of mineral nutrition to productivity of *S. alterniflora* was also determined.

TM 47* 002 056

CHAO, Y.Y., "Wave Refraction Phenomena Over the Continental Shelf Near the Chesapeake Bay Entrance," Oct. 1974.

Keywords: *Computer programs, Virginia--Chesapeake Bay and Chesapeake Light Station, Wave refraction*

A computer refraction program for an area near the Chesapeake Light Station is presented. A cubic spline interpolation scheme is used to define depths at grid points on bathymetric charts. Wave refraction phenomena is summarized in useful forms. Refraction parameters were combined with numerical wave forecasting and hindcasting to calculate refracted wave spectrum at a target. A comparison with wave data from the light station was satisfactory.

TM 48* A008 011

McCLENAN, C.M., and HARRIS, D.L., "The Use of Aerial Photography in the Study of Wave Characteristics in the Coastal Zone," Jan. 1975.

Keywords: *Aerial photography, Wave diffraction, Wave refraction*

Report discusses conditions for good aerial photos of waves and presents examples of many phenomena in wave behavior observed from the perspective afforded by a high elevation.

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TM 49* **A009 755**

BALSILLIE, J.H., "Analysis and Interpretation of Littoral Environment Observation (LEO) and Profile Data Along the Western Panhandle Coast of Florida," Mar. 1975.

Keywords: *Aerial photography, Currents, Geomorphology, LEO, Profiles, Sediments, Storms*

A 100-mile segment of the Florida gulf coast was studied for analysis and interpretation of littoral phenomenon and profile data. Longshore transport rates have been predicted and compared to earlier studies. A physiographic review is presented.

TM 50* **A012 799**

PARARAS-CARAYANNIS, G., "Verification Study of a Bathystrophic Storm Surge Model," May 1975.

Keywords: *Hurricanes, Mathematical models, Storm surge*

Verification of a bathystrophic storm surge numerical model is presented. Historical hurricane data from traverses on the gulf and east coasts were used to calibrate combined values of wind and bottom-stress coefficients in hydrodynamic equations for a numerical computation.

TM 51* **A012 792**

AHRENS, J.P., "Large Wave Tank Tests of Riprap Stability," May 1975.

Keywords: *Hydraulic models, Riprap*

Riprap stability under wave attack was tested at prototype scale in a large wave tank at CERC. Various wave heights, wave periods, and embankment slopes were tested. Study showed that wave period has a significant effect on riprap stability.

TM 52* **A014 136**

GARBISCH, E.W., Jr., WOLLER, P.B., and **McCALLUM, R.J.,** "Salt Marsh Establishment and Development," June 1975.

Keywords: *Chesapeake Bay, Dredge spoil, Salt marshes, Vegetation*

Establishment and development of vegetation within the intertidal and supratidal zones on salt marshes and dredged materials to stabilize shorelines and abate shoreline erosion are reported for the mid-Chesapeake Bay region.

TM 53* **A014 168**

JUDGE, C.W., "Use of the Radioisotopic Sand Tracer (RIST) System," June 1975.

Keywords: *Amphibious vehicles, Radioisotopes, RIST, Sand tracers*

Report analyzes and discusses the equipment and procedures used in the RIST program at CERC. Guidelines are presented for users of the RIST system.

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TM 54* **A015 022**

MEISBURGER, E.P., and FIELD, M.E., "Geomorphology, Shallow Structure, and Sediments of the Florida Inner Continental Shelf, Cape Canaveral to Georgia," July 1975.

Keywords: *Beach nourishment, Geomorphology, ICONS, Sediments, Seismic reflection*

The Inner Continental Shelf off eastern Flordia was surveyed to obtain data on bottom morphology and sediments, subbottom structure, and sand deposits suitable for beach restoration and nourishment. Primary survey data consist of 1,153 miles of seismic reflection profiling and 197 sediment cores.

TM 55* **A015 514**

McCARTNEY, B.L., and AHRENS, J.P., "Stability of Gobi Block Revetment to Wave Attack," Oct. 1975.

Keywords: *Gobi blocks, Hydraulic models, Revetments, Riprap*

Tests of Gobi block revetment stability under wave attack were conducted at prototype scale in a large wave tank at CERC. Wave heights ranging from 1.6 to 3.2 feet and wave periods from 2.8 to 8.5 seconds were used. A 1 on 3.5 embankment slope was tested. Stability compared favorably with similar weight riprap on the same slope. A prototype installation in Louisiana showed greater stability than the wave tank tests; this was attributed to sand and gravel wedged between the blocks.

TM 56 . . . . . **A023 683**

WHITAKER, R.W., REID, R.O., and VASTANO, A.C., "An Analysis of Drag Coefficient at Hurricane Windspeeds from a Numerical Simulation of Dynamical Water Level Changes in Lake Okeechobee, Florida," Oct. 1975.

Keywords: *Drag coefficients, Hurricanes, Lake Okeechobee, Florida, Storm surge*

A time-dependent, two-dimensional storm surge algorithm was used to estimate the drag coefficient over the windspeed range. The algorithm represents a vertically integrated physical model which includes nonlinear boundary conditions representing flooding and recession. Wind and water level data were gathered in the Lake Okeechobee, Florida, region.

TM 57* **A020 028**

LIU, P.L., and MEI, C.C., "Effects of a Breakwater on Nearshore Currents Due to Breaking Waves," Nov. 1975.

Keywords: *Breakwaters, Currents, Wave diffraction, Wave refraction*

A semiempirical theory of nearshore currents due to breaking waves in close proximity to a shore-connected breakwater or an offshore breakwater, is presented. The effects of diffraction are studied in addition to refraction by shoaling waters.

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TM 58 . . . . . **A019 512**

BALSILLIE, J.H., "Surf Observations and Longshore Current Prediction," Nov. 1975.

Keywords: *Currents, Geomorphology, LEO, Profiles, Pt. Mugu, California*

Simultaneous field observations of breakers and current behavior using techniques of the LEO program are presented. Longshore current behavior is investigated by observed and predicted observations. The data base represents a 1-year collection effort at Pt. Mugu, California.

TM 59* **A019 083**

McCLENAN, C.M., "Simplified Method for Estimating Refraction and Shoaling Effects on Ocean Waves," Nov. 1975.

Keywords: *Shoaling, Wave refraction*

This report presents a nomogram for the computation of combined refraction-shoaling coefficients for straight and parallel bottom contours. The nomogram permits a rapid solution of idealized refraction phenomena. The technique provides a useful first estimate to the true solution, and for many problems, as accurate a solution as other time-consuming methods.

TM 60* **A019 936**

JAMES, W.R., "Techniques in Evaluating Suitability of Borrow Material for Beach Nourishment," Dec. 1975.

Keywords: *Beach nourishment, Sediments*

Recent developments in methodology for selection of borrow material and determination of volumetric requirements for beach restoration and periodic nourishment have been presented in three separate reports. This report compares and contrasts the three techniques and recommends guidelines for use in practical applications.

TM 61* **A021 057**

SCHWARTZ, R.K., "Nature and Genesis of Some Storm Washover Deposits," Dec. 1975.

Keywords: *Outer Banks, North Carolina, Presque Isle, Pennsylvania, Sediments, Washover deposits*

This study examines freshly formed small-scale washover deposits along the Atlantic coast at Outer Banks, North Carolina, and along Lake Erie at Presque Isle Peninsula, Pennsylvania, to determine their stratigraphic properties, mode of placement, and relationship to adjacent barrier morphology.

TM 62* **A020 641**

LOFQUIST, K.E.B., "An Effect of Permeability on Sand Transport by Waves," Dec. 1975.

Keywords: *Hydraulic models, Permeability, Ripples, Sediment transport*

Study discusses permeability effects on the movement of sand in oscillatory flows observed in laboratory experiments which approximate prototype conditions at the seabed under progressive waves. Natural sand is used, wave periods range between 3 and 14 seconds, and sand surfaces are naturally rippled. Effects of permeability are cumulative and can be significant in coastal processes of long duration.

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10. MISCELLANEOUS PAPERS

MP 1-64* **440 882**

HALL, J.V., Jr., and JACHOWSKI, R.A., "Concrete Block Revetment Near Benedict, Maryland," Jan. 1964.

Keywords: *Benedict, Maryland, Concrete blocks, Erosion, Low-cost shore protection, Patuxent River, Revetments*

The design and construction of a low-cost groin for shore protection erected near Benedict, Maryland, are discussed. Comparative photos of the area before, during, and after completion of the project are also presented.

MP 2-64* **440 883**

KADIB, A., "Calculation Procedures for Sand Transport by Wind on Natural Beaches," Apr. 1964.

Keywords: *Salmon Beach, California, Windblown sand*

Available methods for calculating the actual rate of sand transport by wind are summarized. Specific procedures and calculation for determining the annual rate of sand transported from the beach inland by wind at Salmon Beach, California, are presented.

MP 3-64* **440 884**

RAYNOR, A.C., and SIMMONS, G.W., "Summary of Capabilities," Apr. 1964.

Keywords: *CERC, Laboratories*

The mission, history, organization, and physical facilities of the Coastal Engineering Research Center (in 1964), are presented. The Center, primarily a hydraulic laboratory, has a 635-foot tank in which 6-foot waves can be generated for prototype testing. This, and other testing wave tanks, are described in detail. Supporting facilities include a petrology laboratory, an electronic instrumentation laboratory, a data reduction and computation shop, and an excellent coastal engineering library which is available for researchers.

MP 4-64* **453 227**

RAYNOR, A.C., ed., "Land Against the Sea," May 1964.

Keywords: *Shore processes, Waves*

Report describes (in nontechnical language) the origin and nature of our seacoasts, the forces to which those coasts are exposed, the behavior of the shores under exposure to those forces, the effects thereon of development by man, and the characteristics of methods for the protection and improvement of the shore. Also described are the roles of the local, State, and Federal Governments in providing for sound development, protection and improvement of the shore, and discussion of the need of long range planning for preservation of our coastal resources.

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MP 5-64* 612 764

VESPER, W.H., and ESSICK, M.G., "A Pictorial History of Selected Structures Along the New Jersey Coasts," Oct. 1964.

Keywords: *Pictorial history*

Comparative photos (ground shots) of shore structures in New Jersey are shown covering the period 1930 to 1961.

MP 6-64* 612 765

HARRISON, W., and WAGNER, K.A., "Beach Changes at Virginia Beach, Virginia," Nov. 1964.

Keywords: *Profiles, Shore processes, Virginia Beach, Virginia*

Descriptive summary of results of repeated profiles measured daily, weekly, or monthly for four transects is presented. The study was not intended to present definitive analysis relating wave action to adjustments in the shore profile, but rather serves to show magnitude of profile variations to be expected over a period of years, seasonally, or in one case, for a single violent storm. Data are also presented and discussed relating to significance of rhythmic undulations of longshore bar-trough systems as they affect range of cut and fill along offshore profiles.

MP 1-66* 629 978

TANEY, N.E., "Interagency Conference on Continental Shelf Research," Jan. 1966.

Keywords: *Continental Shelf, Geomorphology, Sedimentation*

Proceedings of an Interagency Conference on Continental Shelf Research, held at CERC on 13 May 1965 are presented. The contributions describe the magnitude and direction of continental shelf research being conducted by the various interested Federal agencies.

MP 1-67* 652 252

DARLING, J.M., and DUMM, D.G., "The Wave Record Program at CERC," Jan. 1967.

Keywords: *Wave analysis, Wave gages*

Presents a summary of the wave-recording program at CERC and the former Beach Erosion Board. Describes sensors and recorders used, and methods of analysis. Lists information concerning wave gage stations, their locations, date of establishment, equipment used, present status, and periods of time for which records and analyses have been made. Also presents information concerning U.S. Coast Guard stations which have supplied visual observation data; lists the stations, time of establishment, present status, and time periods of observations.

MP 2-67* 652 253

GALVIN, C.J., and NELSON, R.A., "A Compilation of Longshore Current Data," Mar. 1967.

Keywords: *Currents, Waves*

A compilation of published longshore current data comprising 352 separate observations; 225 from four laboratory studies, and 127 from four field studies. Eight tables of data include measured longshore current velocity, wave direction, wave height, wave period, and beach slope.

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MP 3-67* 655 259

MONROE, F.F., "A Feasibility Study of a Wave-Powered Device for Moving Sand," June 1967.

Keywords: *Dredging*

A model of a wave-powered, sand-moving device, suggested by the staff of the U.S. Rubber Company Research Center, was tested for feasibility as a dredging device in 1965. Tests were made at a 1:15 scale. Waves with prototype periods of 5 to 15 seconds were tested. Wave heights varied from 1.1 to 4.4 prototype feet in prototype offshore depths of 38.7, 34.5, and 30 feet. Results indicate the device, at least in its present form, is unsuitable for moving sand shoreward from offshore sources, and further testing in the prototype is not justified. Despite disappointing results, operation of the device illustrates the possibility of a great potential for utilization of wave power.

MP 1-68* 673 721

ALLEN, R.H., and SPOONER, E.L., "Annotated Bibliography of BEB and CERC Publications," July 1968.

Keywords: *Bibliographies*

A bibliography of BEB publications from 1940 to 1963 and of CERC publications from 1963 to 1967. A summary or abstract accompanies each entry. Included is a list of Beach Erosion Control Reports that have been published as House Documents. to aid the user there are indexes of authors, titles, and subjects.

MP 1-69* 688 877

MONROE, F.F., "Oolitic Aragonite and Quartz Sand; Laboratory Comparison Under Wave Action," Apr. 1969.

Keywords: *Hydraulic models, Oolitic aragonite, Quartz sand*

Oolitic aragonite (or oolite) occurs in the Bahama Islands and has been suggested as a material for beach nourishment. CERC tested oolite under laboratory wave conditions by comparing it with quartz sand with the same hydraulic-size characteristics. Early tests indicated that both materials behave similarly under various wave heights and periods. Another test simulated beach nourishment; the two materials behaved almost identically. Since materials used had prototype characteristics, and were compared in a small-scale laboratory test, no accurate correlation to a prototype wave climate can be projected. The softness of oolite and the possibility of biological contamination could be significant in large field tests.

MP 2-69* 690 804

DUANE, D.B., and JUDGE, C.W., "Radioisotopic Sand Tracer Study, Point Conception, California," May 1969.

Keywords: *Point Conception, California, Profiles, Radioisotopes, RIST, Sediments, Tracers*

The purpose is to develop radioactive tracers to research sand movement and littoral processes. Objectives include determination of suitable isotopes and development of

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detectors. Sand indigenous to the area was labeled with Xenon-133. A mobile system housed in a towed "ball" detected radiation. Computer programs corrected and plotted radiation data. Field tests at Point Conception included isotope distribution, sediment analysis, offshore profiles, and oceanic and atmospheric environment monitoring. Model tests at CERC compared high and low specific activity Xenon.

MP 3-69* 697 715

URBAN, H.D., and GALVIN, C.J., "Pipe Profile Data and Wave Observations from the CERC Beach Evaluation Program, January-March 1968," Sept. 1969.

Keywords: *Beach Evaluation Program–CERC, New Jersey–Atlantic City, Long Beach Island, and Ludlam Island, New York–Jones Beach, Long Island, and Westhampton Beach, Profiles, Shore processes, Waves*

Observations of sand levels at pipes placed from dune to low tide terrace along profile lines on five beaches proved a feasible method of surveying beach profiles. For 1-week intervals, January-March 1968, maximum changes at any pipe were 5.7 feet of erosion and 4.7 feet of accretion. Changes in sand level were more likely at pipes on the beach face than at those below mean sea level. Data showed beach steepness and fluctuations in level usually decrease in a north-to-south direction for beaches studied (from Westhampton Beach, New York, to Ludlam Island, New Jersey), in a way that appears related to decreases in wave height and sediment size. Appendixes show profile data and wave observations.

MP 1-70* 702 902

GAGE, B.O., "Experimental Dunes of the Texas Coast," Jan. 1970.

Keywords: *Barrier islands, Beach grass, Dunes, Sand fences, Texas–Corpus Christi Pass, Galveston Island, North Padre Island, and Packery Channel*

Report describes experiments of creating and stabilizing sand dunes to protect the coast. Four locations were selected: the southwest end of Galveston Island, Packery Channel, Newport Pass on North Padre Island, and Corpus Christi Pass. Low areas of the barrier islands were planted in beach grass in an attempt to establish dunes without the aid of sand fences. Sand fencing was used to accumulate windblown sand, and beach grass planted to stabilize dunes. Junk car bodies were placed in line parallel to beaches to establish and stabilize dunes by trapping sand. Since sand fences are more effective and much cheaper, junk cars are not recommended for building dunes.

MP 2-70* 704 720

SZUWALSKI, A., "Littoral Environment Observation Program in California, Preliminary Report," Feb. 1970.

Keywords: *Currents, LEO, Sediments, Waves*

This report describes the Littoral Environment Observation (LEO) program, and assembles in one paper the data collected under the program in February-December 1968. LEO is a cooperative effort of the State of California and the Corps of Engineers to collect littoral data. Beach characteristics recorded are foreshore slope, width and elevation of berm, presence of cusps, and sediment samples. Sea variables include tide level, wave height, period and direction, type of breaker, direction and velocity of

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littoral currents, presence of rip currents, and water temperature. Wind velocity and direction are recorded, and panoramic photos are obtained. The data collected are being used as a base to analyze physical characteristics of the shoreline and littoral processes affecting it.

MP 3-70* 708 556

TURNER, P.A., "RAPLOT, A Computer Program for Data Processing and Graphical Display for Radioisotopic Sand Tracer Study," May 1970.

Keywords: *Computer programs, RIST*

RAPLOT II, a program for processing data from field surveys of Radioisotopic Sand Tracer Study (RIST), is applicable to any survey-type operation on the nearshore shelf. Collected data, punched onto paper tape on the research vessel, are later transferred to magnetic tape for input into RAPLOT II. Program control parameters are on punchcards. Navigation data are converted to coordinates (here, the California Lambert Coordinate System). Radiation data are converted to counts per second. Output is printed, graphical, and on magnetic tape. Processed data are transferred to magnetic tape for further processing, such as generation of contour maps.

MP 4-70* 713 001

DUANE, D.B., "Tracing Sand Movement in the Littoral Zone: Progress in the Radioisotopic Sand Tracer (RIST) Study, July 1968-February 1969," Aug. 1970.

Keywords: *Radioisotopes, RIST, Tracers*

Tagging procedures, instrumentation, field surveys, and data-handling techniques have been developed by the radioisotopic sand-tracing study for the collection and analysis of more than 12,000 bits of information per hour over a survey track of more than 18,000 feet. Experiments at various coastal areas in California used sand tagged with isotopes of xenon or gold. The RIST system can provide data useful in understanding the effect of shore structures on sediment transport.

MP 1-71* 734 891

DAS, M.M., "Longshore Sediment Transport Rates: A Compilation of Data," Sept. 1971.

Keywords: *California–Anaheim Bay and Silver Strand, Sediment transport, South Lake Worth Inlet, Florida*

Report is a compilation of data on longshore sediment transport and associated wave and sediment characteristics from six laboratory studies and four field studies. Laboratory observations include water depth, wave height, wave period, sand size, generator angle with toe of the beach, and longshore transport rate. The maximum transport rate near Anaheim Bay, California, is 2,130 cubic yards per day, north; near South Lake Worth Inlet, Florida, is 1,300 cubic yards per day, south. Estimated transport rate at Silver Strand Beach, California, is 3,400 cubic yards per day, south.

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MP 1-72* 743 942

BALSILLIE, J.H., and BRUNO, R.H., "GROINS: An Annotated Bibliography," Apr. 1972.

Keywords: *Bibliographies, Groins*

About 460 articles published since 1900 on groins and groin-type structures are presented in this bibliography. Annotations accompany each bibliographic entry where possible. Indexes of authors, titles, and subjects are included to aid the researcher.

MP 2-72 . . . . . 744 804

ALLEN, R.H., "A Glossary of Coastal Engineering Terms," Apr. 1972.

Keywords: *Glossaries*

A glossary of terms used by coastal engineers is presented. The terms apply to such subjects as waves, tides, littoral processes, shore protection, shore structures, and coastal geomorphology. Primary sources are cited.

MP 3-72* 755 508

SZUWALSKI, A., "Coastal Imagery Data Bank: Interim Report," Nov. 1972.

Keywords: *Aerial photography*

Report provides information about a Coastal Imagery Data Bank being compiled by CERC. The data bank will consist of a systematic index identifying available aerial photos of the coastal areas of the United States. Compilation is scheduled for completion in fiscal year 1977. This interim report covers data compiled through fiscal year 1972. Imagery for the index is compiled by the Defense Mapping Agency Topographic Command (DMATC) under support and direction of CERC.

MP 1-73* 756 366

THOMPSON, J.R., "Ecological Effects of Offshore Dredging and Beach Nourishment: A Review," Jan. 1973.

Keywords: *Beach nourishment, Dredging, Ecology*

A review of ecological effects of offshore dredging is presented. Although basic ecological works are available, there has been little concrete effort to determine effects of offshore dredging; additional research is needed to approach full understanding. Report shows that a beach may be divided into three zones on the basis of moisture and biota, and describes the possible effects on these biota from offshore dredging and deposition of sediments. Background material and impacts on both offshore dredged areas and nourished beaches, and suggestions for further research are included. A selected bibliography is included.

MP 2-73* 766 720

STAFFORD, D.B., BRUNO, R.O., and GOLDSTEIN, H.M., "An Annotated Bibliography of Aerial Remote Sensing in Coastal Engineering," May 1973.

Keywords: *Bibliographies, Remote sensing*

A bibliography of representative literature covering the applications of aerial remote sensing techniques to coastal engineering. About 200 references published since 1934

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are presented. Annotations accompany each bibliographic entry and are a concise and informative summary of the references describing the characteristics of each remote sensor in coastal engineering investigations. Computer indexes of authors, titles, and keywords are included.

MP 1-74* 777 911

BOOTHROYD, J.C., and HUBBARD, D.K., "Bed Form Development and Distribution Pattern, Parker and Essex Estuaries, Massachusetts," Feb. 1974.

Keywords: *Estuarine sediments, Massachusetts–Essex Estuary and Parker Estuary*

Velocity, depth, temperature, grain size, and bed-form scale and orientation were measured for complete tidal cycles at 50 stations in two New England estuaries. Scuba observation of bed-form change and migration, fathometer profiles, and 700 bed-form scale and orientation readings have led to a sequence of bed forms based on increasing "flow strength."

MP 2-74 . . . . . 777 764

HURME, A.K., "A Glossary of Ecological Terms for Coastal Engineers," Mar. 1974.

Keywords: *Glossaries*

A glossary of basic ecology terms commonly encountered in the field of coastal engineering. The terms are applicable to, but not necessarily restricted to, marine and freshwater environments of the coastal zone. Terms are cross-referenced and defined in nontechnical language for use by nonecologists.

MP 3-74* 785 747

JOHNSON, J.W., "Bolinas Lagoon Inlet, California," May 1974.

Keywords: *Bolinas Lagoon, California, Tidal inlets, Tidal prisms*

The hydraulic and sedimentary characteristics of tidal inlets on sandy coasts are of great interest to engineers involved in harbor design and maintenance. The Bolinas Bay-Lagoon system is a natural laboratory in which a large amount of data has been compiled. The source, nature, and availability of the data on Bolinas Lagoon inlet are summarized as a guide to future studies at Bolinas, and at other inlets.

MP 4-74* 785 552

COASTAL ENGINEERING RESEARCH CENTER, "Hydraulic Method Used for Moving Sand at Hyperion Beach Erosion Project, El Segundo, California," June 1974.

Keywords: *Beach nourishment, Hyperion Beach, California*

This report describes a project near Los Angeles in 1947. The hydraulic method of moving sand was used to widen Hyperion Beach against erosion; about 14 million cubic yards was moved. The report describes the process in detail, shows photos and drawings of the equipment and work, and also shows aerial progress photos of the area. Recommendations for using the method in other areas are presented.

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MP 1-75* A008 010

DUANE, D.B., et al., "A Primer of Basic Concepts of Lakeshore Processes," Jan. 1975.

Keywords: *Bibliographies, Great Lakes, Lakeshore processes*

Report gives a simplified description of the physical processes affecting erosion on lakeshores, specifically the Great Lakes. A detailed bibliography is presented.

MP 2-75 . . . . . A009 500

COASTAL ENGINEERING RESEARCH CENTER, "Guidelines for Monitoring Shore Protection Structures in the Great Lakes," Feb. 1975.

Keywords: *Great Lakes, Monitoring guidelines*

Extent of wave damage to shores is difficult to predict. Shore behavior should be observed to determine the need for a shore protection structure. Optimum and minimum plans for recording shoreline changes and monitoring groins, seawalls, revetments, and offshore breakwaters are given. Simple shore erosion computations and a data analysis program are presented.

MP 3-75* A012 843

PERAINO, J., et al., "Features of Various Offshore Structures," Apr. 1975.

Keywords: *Bibliographies, Breakwaters, Offshore structures*

This report presents the classification and identification of some existing offshore structures, and provides a means of comparison for various structures from the technical, environmental, and economic aspects. A bibliography follows each structure description.

MP 4-75* A010 348

PERAINO, J., and PLODOWSKI, T., "Concept Analysis: Offshore Breakwater-Oil Storage System," Apr. 1975.

Keywords: *Breakwaters, Petroleum storage system, Port structures*

A concept analysis to determine a satisfactory method of providing an answer to the fast-growing need for an offshore breakwater-oil storage system is presented.

MP 5-75 . . . . . A012 854

SALOMAN, C.H., "A Selected Bibliography of the Nearshore Environment: Florida West Coast," Apr. 1975.

Keywords: *Bibliographies*

Bibliography includes a collection of over 2,900 references on ecological and coastal engineering subjects related to the nearshore environment of the Florida west coast. References are grouped by subject and alphabetized by author within each subject heading.

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MP 6-75* A012 839

DODD, J.D., and WEBB, J.W., "Establishment of Vegetation for Shoreline Stabilization in Galveston Bay," Apr. 1975.

Keywords: *Galveston Bay, Texas, Vegetation*

Report discusses the resident species of plants adapted to saline conditions for control of shore erosion in bays and estuaries. The 12 plant species selected are evaluated for their ability to stabilize shorelines. Several combinations of species are suggested for different zones. An inexpensive wave-stilling device to protect plantings from wave action is described.

MP 7-75* A014 137

HALL, V.L., and LUDWIG, J.D., "Evaluation of Potential Use of Vegetation for Erosion Abatement Along the Great Lakes Shoreline," June 1975.

Keywords: *Great Lakes, Vegetation*

This study identifies and evaluates shoreline plants with potential, either alone or in combination with structures, to alter the erosion rate along shores of the Great Lakes. It was determined that plants alone are not suitable erosion controllers along most shores because of severe wave action.

MP 8-75* A016 948

NYBAKKEN, J., and STEPHENSON, M., "Effects of Engineering Activities on the Ecology of Pismo Clams," Sept. 1975.

Keywords: *Monterey Bay, California, Pismo clams*

Three aspects of the ecology of Pismo clams were investigated in Monterey Bay, California: distribution, reproduction cycle, and age and growth. Pismo clam populations were restricted to sand beaches between the Salinas River and Santa Cruz with the highest densities intertidal, and their presence and absence correlated with beach slope and grain size.

MP 9-75* A018 065

DAHL, B.E., et al., "Construction and Stabilization of Coastal Foredunes with Vegetation: Padre Island, Texas," Sept. 1975.

Keywords: *Padre Island, Texas, Sand fences, Vegetation*

Experiments to establish specifications and methodologies for beach grasses in constructing and stabilizing foredunes as storm surge barriers along the gulf coast are presented. Conclusions are based on 2.5 linear miles of experimental plots with beach plantings and fence-built dunes on Padre Island, Texas. Results of greenhouse experiments on the effects of nutrients and salinity on beach-grass growth are also presented.

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MP 10-75* **A018 891**

DAVIS, R.A., Jr., FINGLETON, W.G., and PRITCHETT, P.C., "Beach Profile Changes: East Coast of Lake Michigan, 1970-72," Oct. 1975.

Keywords: *Bluffs, Lake Michigan, Longshore bars, Profiles*

Movement of bluffs (edge of terraces) marking landward boundary or beaches is reported on a 250-mile segment of east coast of Lake Michigan. Variables affecting rate of movement include lake level, bluff or terrace composition, shoreline orientation and straightness, wave climate, manmade structures, and longshore bars.

MP 11-75* **A019 833**

NORDSTROM, C.E., and INMAN, D.L., "Sand Level Changes on Torrey Pines Beach, California," Dec. 1975.

Keywords: *Profiles, Sediments, Torrey Pines Beach, California*

Report presents profile and sediment data collected during a 23-month survey of beach and offshore sand level changes along a straight beach at Torrey Pines, California. Data showed seasonal changes in beach configuration related to changes in the wave regime.

MP 12-75* **A021 577**

AHRENS, J., "Wave Runup on a 1 on 10 Slope," Dec. 1975.

Keywords: *Wave gages, Wave runup*

This study compares the runup caused by monochromatic and simple irregular waves on a smooth 1 on 10 slope. Wave runup was measured by use of a modified step-resistance wave gage which gave reliable measurements of extreme values and also provided a complete time history of the runup-air interface on the slope.

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The Technical Memorandums issued before 1963 by the Beach Erosion Board (BEB) are listed without annotations in this section. The BEB reports are annotated in CERC's Miscellaneous Paper No. 1-68, titled, "Annotated Bibliography of BEB and CERC Publications." CERC no longer has a supply of these BEB reports, but they can be purchased through the National Technical Information Service.

11. BEB TECHNICAL MEMORANDUMS

TM	TITLE	AUTHOR(S)	DATE	AD NUMBER
1	A Model Study of the Effect of Submerged Breakwaters on Wave Action	Hall, W.C.	1940	697 119
2	Abrasion of Beach Sands	Mason, M.A.	Feb. 1942	697 120
3	Shore Processes and Beach Characteristics	Krumbein, W.C.	May 1944	697 121
4	Surface Features of Coral Reefs	Dryden, L.	May 1944	697 122
5	A Wave Method for Determining Depths over Bottom Discontinuities	Mason, M.A.	May 1944	697 123
6	An Ocean Wave Measuring Instrument	Caldwell, J.M.	Oct. 1948	697 124
7	Shore Currents and Sand Movement on a Model Beach	Krumbein, W.C.	Sept. 1944	697 129
8	Depths of Offshore Bars	Keulegan, G.H.	July 1945	697 130
9	Proof Test of Water Transparency Method of Depth Determination	Hall, J.V., Jr.	July 1948	697 131
10	Experimental Steel Sheet Pile Groins, Palm Beach, Florida. Text prepared by Engineering and Research Divisions of BEB. Analysis and reduction of data by C.W. Ross.		1948	697 132
11	Reflection of Solitary Waves	Caldwell, J.M.	Nov. 1949	699 389
12	Durability of Steel Sheet Piling in Shore Structures	Rayner, A.C.	Feb. 1952	699 390
13	Longshore Current Observations in Southern California	Shepard, F.P.	Jan. 1950	699 391
14	Report on Beach Study in the Vicinity of Mugu Lagoon, California	Inman, D.L.	Mar. 1950	699 392
15	Longshore Bars and Longshore Troughs	Shepard, F.P.	Jan. 1950	699 393
16	Accretion of Beach Sand Behind a Breakwater	Handin, J.W.	May 1950	699 394
17	Test of Nourishment of the Shore by Offshore Deposition of Sand	Hall, J.V., Jr.	May 1950	699 395
18	Rayleigh Disk as a Wave Direction Indicator	Hall, J.V., Jr.	July 1950	223 917
19	Submarine Topography and Sedimentation in the Vicinity of Mugu Submarine Canyon, California	Inman, D.L.	July 1950	699 396
20	Beach Cycles in Southern California	Shepard, F.P.	July 1950	699 397
21	The Interpretation of Crossed Orthogonals in Wave Refraction Phenomena	Pierson, W.J., Jr.	Nov. 1950	699 398
22	The Source, Transportation and Deposition of Beach Sediment in Southern California	Handin, J.W.	Mar. 1951	699 399
23	The Use and Accuracy of the Emery Settling Tube for Sand Analysis	Poole, D.W.	May 1951	699 400
24	The Accuracy of Present Wave Forecasting Methods with Reference to Problems in Beach Erosion on the New Jersey and Long Island Coasts	Pierson, W.J., Jr.	Apr. 1951	699 401
25	The Slope of Lake Surfaces under Variable Wind Stresses	Haurwitz, B.	Nov. 1951	699 402
26	Sand Movement on the Shallow Inter-Canyon Shelf at La Jolla, California	Shepard, F.P. Inman, D.L.	Nov. 1951	ATI 169 582
27	Wind Set-up and Waves in Shallow Water	Saville, T., Jr.	June 1952	699 403
28	Source of Beach Sand at Santa Barbara, California, as Indicated by Mineral Grain Studies	Trask, P.D.	Oct. 1952	699 404
29	Artificially Nourished and Constructed Beaches	Hall, J.V., Jr.	Dec. 1952	699 480

BEST DOCUMENT AVAILABLE

11. BEB TECHNICAL MEMORANDUMS–Continued

TM	TITLE	AUTHOR(S)	DATE	AD NUMBER
30	Annotated Bibliography on Tsunamis	Cuellar, M.P.	Feb. 1953	699 405
31	Laboratory Study of Wave Energy Losses by Bottom Friction and Percolation	Savage, R.P.	Feb. 1953	11 564
32	Accuracy of Hydrographic Surveying In and Near the Surf Zone	Saville, T. Jr.	Mar. 1953	20 095
33	Laboratory Investigation of the Vertical Rise of Solitary Waves on Impermeable Slopes	Hall, J.V., Jr.	Mar. 1953	11 565
34	Development and Field Tests of a Sampler for Suspended Sediment in Wave Action	Watts, G.M.	Mar. 1953	20 100
35	Analysis of Moving Fetches for Wave Forecasting	Kaplan, K.	Mar. 1953	24 440
36	Wave and Lake Level Statistics for Lake Michigan	Saville, T., Jr.	Mar. 1953	20 097
37	Wave and Lake Level Statistics for Lake Erie	Saville, T., Jr.	Mar. 1953	20 098
38	Wave and Lake Level Statistics for Lake Ontario	Saville, T., Jr.	Mar. 1953	20 099
39	Areal and Seasonal Variations in Beach and Nearshore Sediments at La Jolla, California	Inman, D.L.	Mar. 1953	20 041
40	The Mechanics of Deep Water, Shallow Water and Breaking Waves	Morison, J.R. Crooke, R.C.	Mar. 1953	20 096
41	Laboratory Study of Equilibrium Profiles of Beaches	Rector, R.L.	Aug. 1954	46 515
42	A Study of Sand Movement at South Lake Worth Inlet, Florida	Watts, G.M.	Oct. 1953	24 439
43	On Ocean Wave Spectra and a New Method of Forecasting Wind-Generated Sea	Neumann, G.	Dec. 1953	26 444
44	Coast Erosion and the Development of Beach Profiles	Bruun, Per	June 1954	40 418
45	Modification of Wave Height Due to Bottom Friction, Percolation, and Refraction	Bretschneider, C.L.	Sept. 1954	48 974
46	Field Investigations of Wave Energy Loss in Shallow Water Ocean Waves	Bretschneider, C.L.	Sept. 1954	47 144
47	Stability of Oscillatory Laminar Flow Along a Wall	Li, Huon	Aug. 1954	49 231
48	Sand Movement by Waves	Scott, T.	Aug. 1954	49 232
49	Bore Hole Studies of the Naturally Impounded Fill at Santa Barbara, California	Trask, P.D.	Aug. 1954	49 233
50	Statistical Significance of Beach Sampling Methods	Krumbein, W.C.	Aug. 1954	46 516
51	Generation of Wind Waves over a Shallow Bottom	Bretschneider, C.L.	Aug. 1954	46 517
52	Laboratory Study of Effect of Tidal Action on Wave-Formed Beach Profiles	Watts, G.M.	Dec. 1954	55 553
53	Laboratory Study of the Effect of Varying Wave Periods on Beach Profiles	Watts, G.M.	Sept. 1954	46 518
54	Laboratory and Field Tests of Sounding Leads	Watts, G.M.	Nov. 1954	77 006
55	North Atlantic Coast Wave Statistics Hindcast by Bretschneider–Revised Sverdrup-Munk Method	Saville, T., Jr.	Dec. 1954	60 787
56	An Electronic Wave Spectrum Analyzer and its Use in Engineering Problems	Pierson, W.J., Jr.	Oct. 1954	48 975
57	North Atlantic Coast Wave Statistics Hindcast by Wave Spectrum Method	Neumann, G.	Feb. 1955	60 788
58	A Magnetic Tape Wave Recorder and Energy Analyzer for the Analysis of Ocean Wave Records	Chang, S.S.	July 1955	109 838
59	Laboratory Study of Shock Pressures of Breaking Waves	Ross, C.W.	Feb. 1955	60 789
60	Generalized Laboratory Study of Tsunami Run-up	Kaplan, K.	Jan. 1955	90 790
61	Laboratory Study of Wind Tides in Shallow Water	Sibul, O.	Aug. 1955	77 007
62	Restudy of Test–Shore Nourishment by Offshore Deposition of Sand, Long Branch, New Jersey	Harris, R.L.	Nov. 1954	55 554
63	A Study of Sediment Sorting by Waves Shoaling on a Plane Beach	Ippen, A.T.	Sept. 1955	77 008
64	Laboratory Data on Wave Runup and Overtopping on Shore Structures	Saville, T., Jr.	Oct. 1955	77 009

BEST DOCUMENT AVAILABLE

11. BEB TECHNICAL MEMORANDUMS—Continued

TM	TITLE	AUTHOR(S)	DATE	AD NUMBER
65	Sand Variation at Point Reyes Beach, California	Trask, P.D. Johnson, C.A.	Oct. 1955	115 101
66	Factors Affecting the Economic Life of Timber in Coastal Structures	Jachowski, R.A.	Dec. 1955	115 102
67	A Model Study of the Run-up of Wind-Generated Waves on Levees with Slopes of 1:3 and 1:6	Sibul, O. Tickner, E.G.	Dec. 1955	74 529
68	Wave Action and Sand Movement Near Anaheim Bay, California	Caldwell, J.M.	Feb. 1956	115 104
69	Wave Forces on Piles: A Diffraction Theory	MacCamy, R.C. Fuchs, R.A.	Dec. 1954	699 406
70	The Effect of Fetch Width on Wave Generation	Saville, T., Jr.	Dec. 1954	55 552
71	Re-Analysis of Existing Wave Force Data on Model Piles	Crooke, R.C.	Apr. 1955	65 350
72	Laboratory Study of the Generation of Wind Waves in Shallow Water	Sibul, O.	Mar. 1955	60 822
73	Graphical Approach to the Forecasting of Waves in Moving Fetches	Wilson, B.W.	Apr. 1955	65 351
74	Water Surface Roughness and Wind Shear Stress in a Laboratory Wind-Wave Channel	Sibul, O.	May 1955	77 512
75	Mechanics of Bottom Sediment Movement Due to Wave Action	Manohar, Madhav	June 1955	77 513
76	Movement of Sand Around Southern California Promontories	Trask, P.D.	June 1955	77 514
77	Behavior of Beach Fill at Ocean City, New Jersey	Watts, G.M.	Mar. 1956	115 380
78	Hurricanes Affecting the Coast of Texas, Galveston to Rio Grande	Price, W. Armstrong	Mar. 1956	115 551
79	Orbital Velocity Associated with Wave Action Near the Breaker Zone	Inman, D.L.	Mar. 1956	98 208
80	Model Study of Overtopping of Wind-Generated Waves on Levees with Slopes of 1:3 and 1:6	Sibul, O. Tickner, E.G.	Apr. 1956	88 706
81	Laboratory Study of Short-Crested Wind Waves	Ralls, C.C., Jr. Wiegel, R.L.	June 1956	71 976
82	Changes in Sand Level on the Beach and Shelf at La Jolla, California	Inman, D.L. Rusnak, G.S.	July 1956	114 828
83	Approximate Response of Water Level on a Sloping Shelf to a Wind Fetch which Moves Directly Towards Shore	Reid, R.O.	June 1956	114 829
84	Wave Forecasting Relationships for the Gulf of Mexico	Bretschneider, C.L.	Dec. 1956	132 762
85	Wave Statistics for the Gulf of Mexico off Brownsville, Texas	Bretschneider, C.L. Gaul, R.D.	Sept. 1956	115 151
86	Wave Statistics for the Gulf of Mexico off Caplen, Texas	Bretschneider, C.L.	Sept. 1956	115 152
87	Wave Statistics for the Gulf of Mexico off Burrwood, Louisiana	Bretschneider, C.L.	Oct. 1956	115 153
88	Wave Statistics for the Gulf of Mexico off Apalachicola, Florida	Bretschneider, C.L.	Oct. 1956	115 154
89	Wave Statistics for the Gulf of Mexico off Tampa, Florida	Bretschneider, C.L.	Oct. 1956	132 763
90	Relative Efficiency of Beach Sampling Methods	Krumbein, W.C.	Sept. 1956	115 155
91	Changes in Configuration of Point Reyes Beach, California	Trask, P.D.	Nov. 1956	111 323
92	Sand Bypassing at Port Hueneme, California	Savage, R.P.	Mar. 1957	132 765
93	Modification of the Quadratic Bottom-Stress Law for Turbulent Channel Flow in the Presence of Surface Wind-Stress	Reid, R.O.	Feb. 1957	132 766
94	Preliminary Report: Laboratory Study of the Effect of Uncontrolled Inlet on the Adjacent Beaches	Saville, T., Jr. Caldwell, J.M. Simmons, H.B.	May 1957	158 636
95	Effect of Bottom Roughness on Wind Tide in Shallow Water	Tickner, E.G.	May 1957	158 635
96	Factors Affecting the Durability of Concrete in Coastal Structures	Mather, B.	June 1957	158 634
97	Turbulent Flow Near an Oscillating Wall	Kalkanis, G.	July 1957	158 751

BEST DOCUMENT AVAILABLE

11. BEB TECHNICAL MEMORANDUMS—Continued

TM	TITLE	AUTHOR(S)	DATE	AD NUMBER
98	Hurricane Wave Statistics for the Gulf of Mexico	Wilson, B.W.	June 1957	158 633
99	Model Tests on a Triple-Bulkhead Type of Floating Breakwater	Ross, C.W.	Sept. 1957	150 541
100	Wave-Generated Ripples in Nearshore Sands	Inman, D.L.	Oct. 1957	150 542
101	Dune Formation and Stabilization by Vegetation and Plantings	Davis, J.H.	Oct. 1957	150 543
102	A Method for Specification of Sand for Beach Fills	Krumbein, W.C.	Oct. 1957	155 596
103	Model Study of Wave Refraction	Wiegel, R.L.	Dec. 1957	156 597
104	The Mechanics of the Motion of Discrete Spherical Bottom Sediment Particles Due to Shoaling Waves	Eagleson, P.S.	Feb. 1958	158 595
105	Movement of Bottom Sediment in Coastal Waters by Currents and Waves: Measurements with the Aid of Radioactive Tracers in the Netherlands	Arlman, J.J.	Mar. 1958	203 936
106	Laboratory Study of Breaking Wave Forces on Piles	Hall, M.A.	Aug. 1958	203 937
107	Behavior of Beach Fill and Borrow Area at Harrison County, Mississippi	Watts, G.M.	Aug. 1958	216 608
108	Surf Statistics for the Coasts of the United States	Helle, J.R.	Nov. 1958	216 609
109	Laboratory Data on Wave Run-up on Roughened and Permeable Slopes	Savage, R.P.	Mar. 1959	216 610
110	Beaches Near San Francisco, California 1956-1957	Trask, P.D.	Apr. 1959	216 771
111	Large-Scale Tests of Wave Forces on Piling (Preliminary Report)	Ross, C.W.	May 1959	216 772
112	The Propagation of Tidal Waves into Channels of Gradually Varying Cross-Section	Perroud, P.	May 1959	227 461
113	Behavior of Beach Fill at Virginia Beach, Virginia	Watts, G.M.	June 1959	227 462
114	Laboratory Study of the Effect of Groins on the Rate of Littoral Transport; Equipment Development and Initial Tests	Savage, R.P.	June 1959	227 463
115	Suspended Sediment Sampling in Laboratory Wave Action	Fairchild, J.C.	June 1959	227 464
116	On the Theory of the Highest Waves	Chappelear, J.E.	July 1959	227 465
117	The Dampling of Oscillatory Waves by Laminar Boundary Layers	Eagleson, P.S.	Aug. 1959	227 466
118	Wave Variability and Wave Spectra for Wind-Generated Gravity Waves	Bretschneider, C.L.	Aug. 1959	227 467
119	Sand Movement by Wind Action (On Characteristics of Sand Traps)	Horikawa, Kiyoshi	Aug. 1960	246 157
120	The Prediction of Hurricane Storm-Tides in New York Bay	Wilson, B.W.	Aug. 1960	246 351
120A	Discussion of Technical Memorandum No. 120	Harris, D.L.	Apr. 1961	258 308
121	Development and Tests of a Radioactive Sediment Density Probe	Caldwell, J.M.	Sept. 1960	246 158
122	Effects of Reefs and Bottom Slopes on Wind Set-up in Shallow Water	Tickner, E.G.	Nov. 1960	252 729
123	Transient Wind Tides in Shallow Water	Tickner, E.G.	Jan. 1961	252 646
124	Experimental Study on the Solitary Wave Reflection Along a Straight Sloped Wall at Oblique Angle of Incidence	Chen, T.C.	Mar. 1961	258 442
125	On the Description of Short-Crested Waves	Chappelear, J.E.	Mar. 1961	258 443
126	Equilibrium Characteristics of Sand Beaches in the Offshore Zone	Eagleson, P.S.	July 1961	266 263
127	Behavior of Beach Fill and Borrow Area at Prospect Beach, West Haven, Connecticut	Vesper, W.H.	Aug. 1961	266 262
128	Geomorphology of the South Shore of Long Island, New York	Taney, N.E.	Sept. 1961	266 264
129	Littoral Materials of the South Shore of Long Island, New York	Taney, N.E.	Nov. 1961	271 022
130	The Analysis of Observational Data from Natural Beaches	Krumbein, W.C.	Nov. 1961	271 024
131	Littoral Studies Near San Francisco Using Tracer Techniques	Kamel, A.M.	Nov. 1962	297 385
132	Waves in Inland Reservoirs (Summary Report on Civil Works Investigation, Projects CW-164 and CW-165), Office, Chief of Engineers		Nov. 1962	297 386
133	Higher Approximation to Nonlinear Water Waves and the Limiting Heights of Cnoidal, Solitary, and Stokes' Waves	Laitone, E.V.	Feb. 1963	420 426
134	Beach Profile as Affected by Vertical Walls	Kadib, Abdel-Latif	June 1963	420 424
135	The Relationship Between Watershed Geology and Beach Radioactivity	Byerly, J.R.	Aug. 1963	420 425

BEST DOCUMENT AVAILABLE

The Miscellaneous Papers issued before 1963 by the Beach Erosion Board (BEB) are listed without annotations in this section. The BEB reports are annotated in CERC's Miscellaneous Paper No. 1-68, titled, "Annotated Bibliography of BEB and CERC Publications." CERC no longer has a supply of these BEB reports, but they can be purchased through the National Technical Information Service

12. BEB MISCELLANEOUS PAPERS

MP	TITLE	AUTHOR(S)	DATE	AD NUMBER
			1959	
1-59	Shore Erosion by Storm Waves	Caldwell, J.M.	Apr.	699 407
2-59	Behavior of Sand-Asphalt Groins at Ocean City, Maryland	Jachowski, R.A.	May	A037 880
3-59	Hurricane Surge Predictions for Chesapeake Bay	Bretschneider, C.L.	Sept.	699 408
4-59	Hurricane Surge Predictions for Delaware Bay and River	Bretschneider, C.L.	Nov.	699 904
			1962	
1-62	A General Reconnaissance of Coastal Dunes of California	Zeller, R.P.	June	699 905

BEST DOCUMENT AVAILABLE

APPENDIX A

AUTHOR INDEX

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

ABELE,R.W.,JR.
MR 77-5

ACREE,E.H.
R 6-71

ADEE,B.H.
TP 76-17

AHRENS,J.P.
CETA 77-2
CETA 77-7
MP 12-75
MR 76-9
R 76-2
TM 23
TM 51
TM 55
TP 76-19
TP 80-3

ALAMO,R.M.
TM 9

ALLEN,R.H.
MP 1-68
MP 2-72

ALLISON,D.M.
TP 76-4

ALTINBILEK,H.D.
TM 28

AMY,L.
MP 3-75

ANDERSON,M.W.
R 3-71

APPAN,S.G.
MP 9-75

AYERS,J.
MR 76-4

AZZINARO,W.P.
TM 41

BALSILLIE,J.H.
MP 1-72
R 15-73
TM 49
TM 58

BARWIS,J.H.
GITI 2
GITI 4

BEHRENS,E.W.
GITI 8
GITI 9

BELLY,P.Y.
TM 1

BERG,D.W.
MR 76-2
R 3-66
R 4-67
R 1-69
R 4-69
R 4-72
R 9-73
R 15-73

BIRKEMEIER,W.A.
MR 80-2
R 79-2

BODINE,B.R.
GITI 6
TM 26
TM 35

BOOTHROYD,J.C.
MP 1-74

BORGMAN,L.E.
TM 13
TM 24
TP 76-9
TP 76-10

BOWEN,A.J.
TM 19

BOWEN,P.R.
MR 80-1(V II)

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

BOWIE,G.L.
MR 77-2
TP 77-11

BRANDES,R.J.
GITI 6(APP.2)

BRASHEAR,H.R.
R 6-71

BREHMER,M.L.
TM 5

BROOME,S.W.
MR 76-3
R 2-72
TM 46
TR 76-2

BROWN,L.J.
TM 24

BRUNO,R.O.
MP 1-72
MP 2-73
MP 1-75
R 4-74
R 77-6
R 78-8

CALDWELL,J.M.
R 1-67

CALLENDER,G.W.,JR.
R 76-5

CAMFIELD,F.E.
CETA 77-6
CETA 78-1
SR 6
TP 77-12

CAMMEN,L.M.
TP 76-7

CARSTENS,M.R.
TM 28

CASE,F.N.
R 6-71

CERC STAFF
MP 3-64
MP 4-64
MP 2-75

CHAO,Y.
TM 47

CHASE,B.L.
MP 3-75

CHATHAM,C.E.,JR.
SR 5

CHEN,R.J.
GITI 6(APP.3)

CHERRY,J.S
TM 14

CHESNUTT,C.B.
MR 77-7
R 11-74
R 3-75
R 4-75
TP 76-11

CHRISTENSEN,D.R.
TP 76-17

COLLINS,J.I.
R 4-75
TP 76-11

COPELAND,B.J.
TP 76-7

CORSON,W.D.
GITI 20

COURTENAY,W.R.,JR.
MR 80-1(V I)
MR 80-1(V II)
TM 41

COX,J.L.
TP 76-14

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

CROSS,R.H.,III
TP 76-8

CZERNIAK,M.T.
R 12-74
R 78-9

DAHL,B.E.
MP 9-75
MR 77-8

DARLING,J.M.
MP 1-67
R 1-68

DAS,M.M.
MP 1-71
R 13-73

DAVIS,R.A.,JR.
MP 10-75
TP 76-16

DEAN,R.G.
SR 1

DEIS,D.R.
MR 80-1(V II)

DEWALL,A.E.
MR 79-5
R 12-74
R 78-4
TP 77-1
TP 77-10

DEWIT,L.A.
MR 78-3
R 78-14

DICKEY,M.D.
MR 79-6(APP.)
MR 79-6

DIENER,D.
MR 78-4

DODD,J.D.
MP 6-75
MR 78-1
TP 76-13

DUANE,D.B.
MP 2-69
MP 4-70
MP 1-75
R 1-69
R 1-70
R 2-70
R 5-71
R 6-71
R 3-72
R 22-73
R 2-75
TM 29
TM 34
TM 42
TM 45

DUMM,D.G.
MP 1-67

DUNHAM,J.W.
SR 2

EAGLESON,P.S.
TM 3
TM 10

ECKERT,J.W.
CETA 79-4
R 78-13

ESCOFFIER,F.F.
GITI 13

ESSICK,M.G.
MP 5-64

ESTEVA,D.C.
R 2-71
TP 77-7

EVERTS,C.H.
R 1-74
R 12-74
R 76-1
R 77-1
R 78-9

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

R 79-3
TP 76-1
TP 78-4

FAIRCHILD,J.C.
R 4-66
R 14-73
TM 18
TP 77-5

FALL,B.A.
MP 9-75

FIELD,M.E.
R 24-73
R 79-7
TM 42
TM 54
TP 79-2

FINGLETON,W.G.
MP 10-75

FINLEY,R.J.
GITI 10

FINN,A.A.
SR 2

FUSCH,K.E.
R 1-75

GABLE,C.G.
R 77-6
R 78-8

GAGE,B.O.
MP 1-70

GALVIN,C.
TP 80-4

GALVIN,C.J.,JR.
MP 2-67
MP 3-69
MR 77-3
R 2-68
R 3-68
R 4-70
R 5-72
R 4-73
R 12-73
R 19-73
R 11-74
TM 4
TM 10
TP 77-1
TP 79-1

GARBISCH,E.W.,JR.
TM 52

GARCIA,W.J.
R 2-66

GILES,M.L.
CETA 79-4
R 78-5
TP 78-3

GLOVER,J.R.
R 77-5
TP 76-6

GOEN,J.P.
MR 77-8

GOLDSMITH,V.
MR 77-12

GOLDSTEIN,H.M.
MP 2-73

GORBICS,C.S.
MR 79-2

HAGAR,J.
R 79-5

HALES,L.Z.
SR 5

HALL,J.V.,JR.
MP 1-64
R 2-67

HALL,V.L.
MP 7-75

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

HALLERMEIER,R.J.
R 6-73
R 19-73
R 8-74
R 77-3
R 77-4
R 79-11
TP 77-9
TP 78-1

HANDS,E.B.
MP 1-75
R 78-7
R 78-11
TP 79-4
TR 76-1

HANES,R.E.
TM 22

HARRIS,D.L.
GITI 6
GITI 14
MP 1-75
R 1-71
R 2-71
R 1-72
R 2-73
R 23-73
R 6-74
R 79-8
TM 48
TP 76-12
TR 79-1

HARRISON,A.S.
TM 37

HARRISON,W.
MP 6-64
TM 5
TM 6
TM 7
TM 8
TM 9

HARTIG,B.C.
MR 80-1(V I)

HAUGEN,J.C.
R 16-73

HAWLEY,E.F.
R 9-73

HEMBREE,L.A.,JR.
GITI 6(APP.3)

HERCHENRODER,B.E.
GITI 14

HERREMA,D.J.
TM 41

HERRMANN,F.A.,JR.
SR 5

HERRON,W.J.,JR.
R 11-73

HIIPAKKA,L.W.
R 4-74

HOBSON,R.D.
CETA 79-7
R 78-10
R 79-9
TP 77-6

HOLMES,L.
TP 76-5

HUBBARD,D.K.
MP 1-74

HUDSON,R.Y.
SR 5

HUMPHRIES,S.M.
GITI 16

HURD,J.
MP 4-74

HURME,A.K.
CETA 79-3
MP 2-74
MR 78-2
R 78-14

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

R 79-4

HUVAL,C.J.
GITI 6(APP.4)

INMAN,D.L.
MP 11-75
TM 19
TM 21
TP 76-5

JACHOWSKI,R.A.
MP 1-64
R 25-73

JAIN,S.C.
GITI 17

JAMES,W.R.
R 7-71
R 7-73
R 8-74
R 13-74
R 77-3
R 79-9
TM 16
TM 44
TM 60

JARMAN,J.W.
R 4-72
R 18-73

JARRETT,J.T.
GITI 3
R 78-3

JOHNSON,G.F.
MR 78-3
R 78-14

JOHNSON,J.W.
MP 3-74

JUDGE,C.W.
MP 2-69
TM 33
TM 53

KADIB,A.
MP 2-64

KALKANIS,G.
TM 2

KEITH,J.M.
TM 43

KENNEDY,J.F.
GITI 17
R 77-5

KEULEGAN,G.H.
SR 5

KIESLICH,J.M.
GITI 12
R 76-4

KNUTSON,P.L.
CETA 77-3
CETA 77-4
MR 78-2
MR 79-2
R 78-2
R 78-12

KOONTZ,W.A.
TM 21

KRUMBEIN,W.C.
TM 7
TM 16
TM 8
TM 44

LACY,S.
MR 78-4

LEMEHAUTE,B.
MR 77-10

LEO,C.E.
R 2-66

LESNIK,J.R.
CETA 77-5
MR 79-1

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

LEVY,G.F.
MR 76-6

LIU,P.L.
TM 57

LOCHER,F.A.
R 77-5
TP 76-6

LOFQUIST,K.E.B.
MR 77-1
TM 62
TP 78-5

LOHSE,A.
MP 9-75

LOISEL,G.R.
MR 80-1(V I)

LOWE,R.L.
TP 76-5

LUDWIG,J.D.
MP 7-75

LYLES,A.M.
MR 79-6(APP.)
MR 79-6

MACDONALD,T.C.
TP 77-4

MADSEN,O.S.
MR 76-5
R 4-71

MAGOON,O.T.
R 2-69
R 8-71
R 4-72
R 1-73
R 5-73
R 16-73
R 17-73
R 18-73

MARSH,G.A.
MR 80-1(II)

MASCH,F.D.
GITI 6(APP.2)

MASON,C.
GITI 8
R 10-73
R 10-74
R 76-4
R 79-12

MATTA,J.F.
MR 77-6

MATTIE,M.G.
R 79-8
TR 79-1

MAYOR-MORA,R.E.
GITI 11

MCCALLUM,R.J.
TM 52

MCCARTNEY,B.L.
MR 76-7
R 76-2
TM 55
TP 76-19

MCCLENAN,C.M.
TM 48
TM 59

MCNAIR,E.C.
GITI 7

MEI,C.C.
TM 57

MEISBURGER,E.P.
MR 77-11
MR 79-3
MR 79-4
R 1-70
R 79-7
TM 29
TM 34
TM 38
TM 54

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

TP 76-3
TP 79-3

MILLER,G.H.
MR 76-2

MONROE,F.F.
MP 3-67
MP 1-69

MOORE,H.E.
TP 76-1

MORRIS,J.H.
MR 79-2

MULTER,R.H.
TM 31

MUSIALOWSKI,F.R.
MR 76-11
R 76-3
R 78-6
TP 80-1

NAKATO,T.
R 77-5
TP 76-6

NEIHEISEL,J.
TM 12

NEILSON,F.M.
TM 28

NELSON,R.A.
MP 2-67

NEUMANN,D.A.
MR 76-1
TP 76-20
TP 77-3

NEWCOMBE,C.L.
MR 79-2

NORDSTROM,C.E.
MP 11-75

NUMMEDAL,D.
GITI 16

NYBAKKEN,J.
MP 8-75

OBRIEN,M.P.
GITI 5

OCONNOR,J.M.
MR 76-1
TP 76-20
TP 77-3

OLIVER,J.S.
TP 76-15

PARARAS-CARAYANNIS,G
TM 39
TM 50

PARKER,N.E.
R 79-14

PARR,T.
MR 78-4

PAWKA,S.S.
TP 76-5

PEACOCK,H.G.
R 5-74

PERAINO,J.
MP 3-75
MP 4-75

PERLIN,M.
R 79-6

PETRAUSKAS,C.
TP 76-18

PHILLIPS,R.C.
CETA 80-2

PILKEY,O.H.
R 24-73

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

PIRIE,D.M.
R 17-73
R 18-73

PLODOWSKI,T.
MP 3-75
MP 4-75

PRINS,D.A.
CETA 80-4
MR 76-11
MR 79-3
MR 79-4
R 2-74
R 9-74
R 76-3

PRITCHETT,P.C.
MP 10-75
MR 76-8
TP 77-1

PULLEN,E.J.
CETA 79-3
MR 78-2

QUINN,M.L.
MR 77-9

RABCHEVSKY,G.A.
R 3-74

RAMSEY,M.D.
MR 77-3

RAY,R.E.
MR 77-4
MR 79-6(APP.)
MR 79-6
TP 78-1

RAYNOR,A.C.
MP 3-64
MP 4-64

REAGAN,J.D.
GITI 6(APP.2)

REID,R.O.
TM 56
TP 77-13
TR 76-3

REID,T.J.
TP 77-13

RHODES,E.G.
TM 40

RICHEY,E.P.
TP 76-17

RICHTER,J.J.
R 78-4

ROBERTS,J.
R 79-5

SAGER,R.A.
GITI 6(APP.1)
GITI 15
GITI 18
SR 5

SALOMAN,C.H.
MP 5-75
MR 76-10

SARLIN,W.D.
R 8-71

SAVAGE,R.P.
R 3-69
TP 76-4

SAVILLE,T.,JR.
R 2-66
R 3-67
R 3-70
R 26-73
R 1-75
R 77-2

SCHNEIDER,C.
R 78-1

SCHWARTZ,R.K.
R 78-6
TM 61
TP 80-1

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

SCHWEPPE,C.R.
TP 80-4

SEABERGH,W.C.
GITI 6(APP.1)
GITI 15
GITI 18

SEELIG,W.N.
CDM 76-1
CETA 77-1
CETA 79-5
CETA 79-6
CETA 80-1
GITI 14
R 79-10
TP 77-2
TP 77-8
TP 80-3

SENECA,E.D.
MR 76-3
R 2-72
TM 46
TP 76-7
TR 76-2

SHERK,J.A.,JR.
MR 76-1
TP 76-20
TP 77-3

SHIMIZU,N.
R 1-73

SIMMONS,G.W.
MP 3-64

SKJEI,R.E.
TM 43

SLAON,R.L.
R 16-73

SLATTERY,P.N.
TP 76-15

SOBEY,R.J.
TM 32

SOLDATE,M.
MR 77-10

SOLLITT,C.K.
TP 76-8

SONU,C.J.
R 7-73

SORENSEN,R.M.
CETA 77-8
R 10-73
R 79-10
TP 77-8
TP 78-3

SPOONER,E.L.
MP 1-68

STAFFORD,D.B.
MP 2-73
TM 36

STAFFORD,R.P.
MR 77-7

STANLEY,E.A.
R 79-7

STEPHENSON,M.
MP 8-75

STOA,P.N.
CETA 78-2
CETA 79-1
TP 78-2

STOKES,R.
MR 76-4

STONE,R.B.
TM 5

STRUM,S.C.
MR 77-12

SZUWALSKI,A.
MP 2-70
MP 3-72

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

TANEY,N.E.
MP 1-66

TELEKI,P.G.
MR 76-11
R 3-71
R 21-73
R 2-74
R 3-74
R 9-74
R 76-3

THOMAS,G.R.
MR 77-12

THOMPSON,E.F.
R 1-72
R 7-74
R 80-1
TP 80-2
TR 77-1
TR 78-1

THOMPSON,J.R.
MP 1-73

THOMPSON,M.J.
TM 41

THOMSEN,A.L.
TM 37

TORUM,A.
TM 25

TURBEVILLE,D.B.
MR 80-1(II)

TURNER,P.A.
MP 3-70
R 6-71

URBAN,H.D.
MP 3-69

VALLIANOS,L.
R 25-73

VAN DE WATERING,W.P.
TM 3

VAN MONTFRANS,J.
TM 41

VASTANO,A.C.
TM 56
TP 77-13
TR 76-3

VESPER,W.H.
MP 5-64
TM 11
TM 20

VINCENT,C.L.
GITI 20

VITALE,P.
CETA 80-6
R 79-13

WAGNER,K.A.
MP 6-64

WALES,B.A.
R 78-14

WALTON,T.L.,JR.
CETA 80-3

WANSTRATH,J.J.
TR 76-3

WATKINS,L.L.
TM 27

WATSON,R.L.
GITI 8
GITI 9

WATTS,G.M.
R 4-67
R 25-73
R 78-8

WEBB,J.W.
MP 6-75
MR 78-1

BEST DOCUMENT AVAILABLE

AUTHOR INDEX

TP 76-13

WEGGEL,J.R.
CETA 79-2
R 3-73
R 8-73
R 20-73
R 1-75
R 77-7
R 79-5

WEYMOUTH,O.F.
R 2-69

WHALIN,R.W.
SR 5

WHITAKER,R.E.
TM 56
TR 76-3

WHITE,J.W.
R 2-74
R 3-74

WHITE,S.M.
MR 76-5

WIEGEL,R.L.
MR 77-2

WILLIAMS,L.C.
R 1-66
TM 30

WILLIAMS,S.J.
MR 79-3
MR 79-4
R 3-72
R 2-75
R 79-1
R 79-7
TM 45
TP 76-2

WILSON,B.W.
TM 15
TM 25

WILSON,W.S.
TM 6
TM 17
TM 8

WINTERGERST,G.L.
GITI 6(APP.4)

WOHLT,P.E.
TM 37

WOLLER,P.B.
TM 52

WOODHOUSE,W.W.,JR.
MR 76-3
R 3-69
R 2-72
SR 3
SR 4
TM 22
TM 46
TR 76-2

YANCEY,R.M.
CETA 79-3
MR 78-2

BEST DOCUMENT AVAILABLE

APPENDIX B

SUBJECT INDEX

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

ACOUSTIC FLOWMETER
TM 31

ADDED MASS
TP 76-18

AERIAL PHOTOGRAPHY
MP 3-72
R 5-73
R 9-74
R 79-8
TM 36
TM 48
TM 49
TR 79-1

ALASKA
TM 25

AMERICAN BEACHGRASS
MR 76-3

AMPHIBIOUS VEHICLES
TM 53

ANAHEIM BAY,CA
MP 1-71

ANIMAL COLONIZATION
TP 76-7

ARMOR UNITS
MR 78-3
R 2-69
R 1-73
R 78-5
TM 37
TM 43
TP 76-4
TP 76-19
TP 78-2

ARTIFICIAL ISLANDS
MR 78-3
R 2-75
R 78-14
TM 43

ARTIFICIAL REEFS
R 79-4

ARTIFICIAL SEAWEED
MR 76-9

ATLANTIC CITY,NJ
MP 3-69
MR 77-3
R 12-74
TP 77-1

ATLANTIC COAST
R 22-73
R 79-7
TP 78-4
TR 77-1

AUSTRALIA
R 3-74

BARRIER ISLANDS
MP 1-70

BEACH CHARACTERISTICS
TM 44

BEACH EROSION BOARD
MR 77-9

BEACH EVALUATION PROGRAM-CERC
MP 3-69
MR 77-3
MR 79-5
R 78-4
R 78-9
TP 77-1
TP 77-10
TP 78-4

BEACH GEOMETRY
TM 7

BEACH GRASSES
CETA 77-4
MP 1-70
R 78-12
TM 22

BEACH NOURISHMENT
MP 1-73
MP 4-74

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

MR 78-4
MR 80-1(V I)
MR 80-1(V II)
R 3-66
R 1-69
R 25-73
R 26-73
R 12-74
R 13-74
R 78-6
R 78-10
R 79-9
TM 11
TM 16
TM 20
TM 29
TM 38
TM 41
TM 42
TM 45
TM 54
TM 60
TP 76-2
TP 76-3
TP 77-6
TP 79-3
TP 80-1

BED FORMS
R 77-5
R 79-13
TM 28
TP 78-5

BEDLOAD
R 1-74

BENEDICT,MD
MP 1-64

BENTHOS
MR 80-1(V II)
R 78-14
TP 76-15

BERRIEN COUNTY,MI
MR 80-2

BIBLIOGRAPHIES
MR 79-6(APP.)
GITI 4
MP 1-68
MP 1-72
MP 2-73
MP 1-75
MP 3-75
MP 5-75
MR 77-2
MR 78-2
MR 79-1
MR 79-6

BIOLOGICAL COMPONENTS
MR 76-1

BITTER PANICUM
MR 76-3

BLUFF EROSION
TP 76-16

BLUFFS
MP 10-75
MR 80-2

BOCA RATON,FL
R 78-4
TP 77-10

BODEGA HEAD,CA
TM 14

BOGUE SOUND,NC
TR 76-2

BOLINAS LAGOON,CA
MP 3-74

BOULDERS
TP 76-19

BOUNDARY LAYER FLOW
R 21-73
TM 2

BREAKERS
MR 76-8
MR 77-5
R 3-68
R 4-70

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

R 3-73
R 4-73
R 8-73

BREAKWATERS
CDM 76-1
CETA 79-4
MP 3-75
MP 4-75
MR 76-5
MR 77-4
MR 79-1
R 2-66
R 3-70
R 4-70
R 78-8
R 79-4
R 79-6
TM 57
TP 76-4
TP 76-8
TP 76-17
TP 78-3

BRIGANTINE,NJ
MR 77-3

BROWARD COUNTY,FL
MR 80-1(V I)
TM 41

BROWN CEDAR CUT,TX
R 10-73

BRUNSWICK HARBOR,GA
TM 12

BULK DENSITY
TP 76-1

BULKHEADS
MR 76-4

CAPE CANAVERAL,FL
TM 42

CAPE COD,MA
TP 77-1

CAPE FEAR,NC
TP 79-3

CAPE HATTERAS,NC
TM 22

CAPE KENNEDY,FL
TM 34

CAPE MAY,NJ
R 79-3

CARTERET COUNTY,NC
TM 36

CATALOGS
GITI 2

CATHODIC PROTECTION
TM 27

CERC
MP 3-64
R 1-75

CHANNEL ISLANDS,CA
R 78-8
R 77-6

CHESAPEAKE BAY
TM 35
TM 38
TM 47
TM 52

CHESAPEAKE LIGHT STATION
TM 47

COASTAL ENGINEERING
MR 79-6(APP.)
CETA 80-6
MR 79-6
SPM

COASTAL FAUNA
MR 76-10
MR 77-6
TP 76-7

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

COMPUTER PROGRAMS
CETA 77-1
CETA 79-5
GITI 6
GITI 14
MP 3-70
R 6-71
TM 17
TM 47
TP 76-9
TP 77-13
TR 76-3

COMPUTERS
TM 7

CONCRETE BLOCKS
MP 1-64
R 78-5

CONCRETE JACKETS
TM 27

CONTINENTAL SHELF
CETA 80-4
MP 1-66
R 1-70
R 3-72
R 22-73
R 24-73
TM 29
TM 45

COORDINATE TRANSFORMATION
TR 76-3

CORPUS CHRISTI PASS,TX
GITI 8
GITI 9
MP 1-70

COVER LAYER
TP 76-4

CRITICAL RATIO
TM 16

CURRENT METERS
MR 76-11
TM 3
TM 5
TM 21

CURRENTS
CETA 77-8
CETA 80-3
GITI 14
MP 2-67
MP 2-70
MR 77-5
R 2-68
R 3-70
R 2-74
R 9-74
R 76-3
R 78-1
R 79-2
TM 8
TM 10
TM 49
TM 57
TM 58
TP 76-1
TP 77-10

CYLINDERS
R 19-73

DAMPING
TP 76-18
TP 77-2

DARE COUNTY,NC
R 79-2

DATA COLLECTION
CETA 80-4
R 4-69
R 76-3
R 79-2

DELMARVA PENINSULA
TP 79-2

DEPOE BAY,OR
TM 23

DEPOSITION
R 20-73

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

DIFFUSION
TM 5

DIKES
R 78-13

DILLINGHAM,AK
R 77-1

DOCKS
SR 2

DOLOS
R 1-73

DRAG COEFFICIENTS
TM 24
TM 28
TM 56

DRAG FORCES
TP 77-11

DRAKES BAY,CA
TM 14

DREDGE SPOIL
MR 76-1
R 2-72
R 78-13
TM 52
TP 76-7
TP 76-15

DREDGING
MP 3-67
MP 1-73
R 78-6
R 78-10

DRUM INLET,NC
TP 76-7

DUCK,NC
MR 76-6
MR 77-6
R 79-12

DUNE BUILDING
MR 76-3
SR 3

DUNE STABILIZATION
MR 76-3
SR 3

DUNES
MP 1-70
MR 76-3
MR 76-6
MR 77-8
R 3-69
R 78-12
SR 3
TM 22
TM 28

DYE TRACERS
MR 76-11

EARTHQUAKES
TM 25

EAST BAY,TX
MR 78-1
TP 76-13

ECOLOGICAL SYSTEMS
TP 76-15

ECOLOGY
MP 1-73
MR 78-2
MR 78-3
MR 80-1(V I)
TM 41

ELECTRO-OPTICAL INSTRUMENT
TP 76-6

ENERGY FLUX
TP 79-1

ENERGY SPECTRA
TP 80-2

ENVIRONMENTAL EFFECTS
TP 76-15

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

EQUILIBRIUM PROFILES
R 4-75

EROSION
CETA 80-2
MP 1-64
MR 79-2
MR 79-5
MR 80-2
R 1-67
R 78-2
R 79-11
TP 76-7
TP 77-1

EROSION RATES
CETA 79-2

ERTS
MR 76-2
R 5-73
R 18-73
R 3-74

ESSEX ESTUARY,MA
MP 1-74

ESTUARINE ECOLOGY
TP 77-3

ESTUARINE FISH
TP 76-20

ESTUARINE PLANKTON
MR 76-1

ESTUARINE SEDIMENTS
MP 1-74

FALL VELOCITY
TP 77-4

FAST FOURIER TRANSFORM
TP 76-9

FERTILIZATION
CETA 77-3
CETA 77-4
SR 3
SR 4
TR 76-2

FERTILIZERS
R 78-12
TM 22
TP 76-13

FIELD RESEARCH FACILITY-CERC
MR 76-6
MR 77-6
R 79-12

FILTERS
MR 76-7

FISH
MR 78-3
MR 80-1(V I)
R 78-14
TP 76-20
TP 77-3

FIXED-BED MODELING
GITI 18

FLASH FLOODS
CETA 78-1

FLOATING BREAKWATERS
CETA 79-4
TP 76-17
TP 78-3

FLORISTICS
MR 76-6

FLUID FLOW
R 20-73

FRICTION FACTOR
MR 76-5
R 79-13

FRIDAY HARBOR,WA
TP 76-17

GALVESTON BAY,TX
MP 6-75

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

GALVESTON COUNTY,TX
MR 79-4

GALVESTON ISLAND,TX
MP 1-70

GAUSSIAN DISTRIBUTION
R 80-1

GEOLOGY
R 3-72
R 79-7

GEOMORPHOLOGY
MP 1-66
MR 79-3
MR 79-4
R 79-1
TM 29
TM 34
TM 38
TM 40
TM 42
TM 45
TM 49
TM 54
TM 58
TP 76-2
TP 76-3
TP 79-2

GEOTECHNICAL ENGINEERING
R 76-5

GLACIAL BOULDERS
TM 37

GLOSSARIES
MP 2-72
MP 2-74

GOBI BLOCKS
TM 55

GOLDEN BEACH,FL
MR 80-1(V II)

GRAIN SHAPE
TP 76-11

GRAIN-SIZE DISTRIBUTION
CETA 79-7

GRASSES
CETA 80-2
TP 76-7

GREAT LAKES
MP 1-75
MP 2-75
MP 7-75
MR 80-2
R 3-66
TP 77-8
TP 79-4

GROINS
MP 1-72
MR 76-4
MR 79-5
R 4-67
R 15-73
R 79-3

GULF COAST
TP 78-4
TR 77-1

GULF OF CARPENTARIA
R 3-74

GULF OF MEXICO
TM 15
TP 76-10

HALF-TIDE HARBOR
R 77-1

HALLANDALE,FL
MR 80-1(V II)
MR 80-1(V I)

HARBORS
R 79-14
SR 2
TM 23
TP 76-1

HEAVY MINERALS
TM 33

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

HINDCASTING
TM 6
TR 78-1

HISTORY
MR 77-9

HOLLYWOOD,FL
R 78-4
TP 77-10

HUMBOLDT BAY,CA
R 1-73

HURRICANE CAMILLE
TR 76-3

HURRICANE CARLA
TP 76-10
TP 77-13
TR 76-3

HURRICANE ELOISE
MR 76-10

HURRICANE GRACIE
TR 76-3

HURRICANE SURGE
TP 77-13

HURRICANE WAVES
TP 76-10

HURRICANES
TM 26
TM 35
TM 50
TM 56
TR 76-3

HYDRAULIC MODELS
GITI 6
GITI 7
GITI 11
GITI 15
GITI 18
MP 1-69
SR 5
TM 23
TM 37
TM 51
TM 55
TM 62

HYDROGRAPHIC SURVEYS
R 8-71

HYPERION BEACH,CA
MP 4-74

ICONS
MR 77-11
MR 79-3
MR 79-4
R 1-70
R 2-70
R 3-72
R 24-73
TM 29
TM 34
TM 38
TM 42
TM 45
TM 54
TP 76-2
TP 79-2
TP 79-3

IMPACT FORCES
CETA 78-1

IMPERIAL BEACH,CA
MR 78-4

INLETS
GITI 15
TP 77-8

INNER CONTINENTAL SHELF
R 79-7
TP 78-4
TP 79-2
TP 79-3

INSTRUMENTATION
MR 76-11
R 1-66

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

R 6-73
R 8-74
R 76-3
R 77-3
TM 3
TM 30
TM 31
TP 77-2

INTERLOCKING BLOCKS
R 2-67

IRREGULAR WAVE RUNUP
CETA 77-2

IRREGULAR WAVES
CETA 77-7
CETA 79-5
CETA 80-1

ISLAND BEACH,NJ
MR 77-3

JETTIES
R 76-4
R 79-14

JONES BEACH,NY
MP 3-69
TP 77-1

JUPITER,FL
R 78-4
TP 77-10

KNIK ARM,AK
TP 76-1

LABORATORIES
MP 3-64

LABORATORY WAVE FACILITIES
MR 77-7
TP 76-12

LAKE ERIE
R 3-66

LAKE LEVELS
R 78-7
R 78-11
TP 76-16
TP 79-4
TR 76-1

LAKE MICHIGAN
MP 10-75
MR 79-3
R 4-74
R 78-7
R 78-11
TP 76-16
TP 79-4
TR 76-1

LAKE MIGHICAN
MR 80-2

LAKE OKEECHOBEE,FL
TM 56

LAKESHORE PROCESSES
MP 1-75

LEO
CETA 80-3
MP 2-70
R 4-69
R 4-74
R 78-1
R 78-4
TM 49
TM 58
TP 77-10

LETHAL EFFECTS
TP 76-20

LIFT FORCES
TM 2
TP 77-11

LITTORAL BARRIERS
TM 14

LONG BEACH ISLAND,NJ
MP 3-69
MR 77-3
R 78-9
R 79-2

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

TP 77-1

LONG ISLAND,NY
MP 3-69
TP 76-2

LONGSHORE BARS
MP 10-75
TP 76-11
TR 76-1

LONGSHORE ENERGY FLUX
CETA 80-3
R 78-3
TP 80-4

LOW COST SHORE PROTECTION
MP 1-64

LUDLAM ISLAND,NJ
MP 3-69
MR 77-3
R 78-9
R 79-2
TP 77-1

MACROFAUNA
MR 78-4
TP 76-14

MACROINVERTEBRATES
CETA 79-3

MARINAS
SR 2

MARINE ENGINEERING
MR 76-4

MARINE LIMESTONE
TP 76-4

MARINELAND,FL
R 78-1

MARKOV
R 7-73

MARSH ECOLOGY
R 2-72

MARSH PLANTS
CETA 77-3
MR 79-2
TP 76-13

MARSH VEGETATION
SR 4
TR 76-2

MASONBORO INLET,NC
GITI 18
GITI 13
GITI 6
GITI 15

MASS COEFFICIENTS
TM 24

MASSACHUSETTS BAY
TP 76-3

MATHEMATICAL MODELS
CETA 77-1
CETA 79-5
GITI 6
GITI 14
MR 77-10
R 79-6
R 79-10
SR 6
TM 16
TM 32
TM 35
TM 50
TP 77-13
TR 76-3
TR 78-1

MEIOFAUNA
MR 78-4
TP 76-14

METEOROLOGICAL DATA
MR 77-5

MIAMI,FL
TM 29

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

MINERAL SOLIDS
TP 76-20

MISQUAMICUT,RI
TP 77-1

MISSION BAY,CA
GITI 13
R 11-73

MONITORING GUIDELINES
MP 2-75

MONTEREY BAY,CA
MP 8-75
TP 76-14
TP 76-15

MOORING FORCES
CETA 79-4
TP 78-3

MORPHOLOGICAL CHANGES
MR 76-2

MOVABLE-BED MODELING
GITI 7
GITI 17
MR 77-7
R 11-74
R 3-75
R 4-75
SR 5
TP 76-11

MULTISPECTRAL SCANNER
MR 76-2

NAGS HEAD,NC
R 4-66
R 14-73
TP 77-5

NATURAL TRACERS
TM 12

NEW BERN,NC
TP 76-4

NEW RIVER INLET,NC
R 78-6
R 78-10
R 79-9
TP 80-1

NEW YORK BIGHT
R 2-75
R 79-1
TM 39
TM 45

NEWPORT,CA
R 9-73

NORTH INLET,SC
GITI 10
GITI 16

NORTH PADRE ISLAND,TX
MP 1-70

OAHE RESERVIOR,SD
TP 76-19

OFFSHORE PLATFORMS
TP 76-18

OFFSHORE STRUCTURES
MP 3-75
R 3-72

ONSLOW COUNTY,NC
TM 36

OOLITIC ARAGONITE
MP 1-69

ORBITAL VELOCITY METERS
TM 3

OUTER BANKS,NC
TM 61

PACIFIC COAST
TR 77-1

PACKERY CHANNEL,TX
MP 1-70

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

PADRE ISLAND,TX
MP 9-75
MR 77-8

PALM BEACH,FL
TM 29
TM 34

PANAMA CITY BEACH,FL
MR 76-10

PARKER ESTUARY,MA
MP 1-74

PATENTS
MR 79-6(APP.)
MR 79-6

PATUXENT RIVER,MD
MP 1-64
TP 76-20
TP 77-3

PEAT DEPOSITS
R 79-7

PENTWATER HARBOR,MI
TP 77-8
TR 76-1

PERMEABILITY
TM 62

PERMEABLE BREAKWATERS
CETA 79-6
TP 76-8

PETROLEUM STORAGE SYSTEM
MP 4-75

PHI GRADE SCALE
CETA 79-7

PHOTOGRAPHY
R 9-73

PHYTOSOCIOLOGY
MR 76-6

PICTORIAL HISTORY
MP 5-64

PIERS
MR 76-4
R 79-12
SR 2

PILES
R 77-4
TM 13
TM 15
TM 24
TM 27
TP 78-1

PIPELINES
MR 77-2
TP 77-11

PISMO CLAMS
MP 8-75

PISTON-TYPE WAVE GENERATOR
R 4-71

PLANT ECOLOGY
MR 76-6

PLUM ISLAND,MA
MR 77-5
TM 40

POINT ARGUELLO,CA
TM 19

POINT CONCEPTION,CA
MP 2-69
TM 33

POINT REYES,CA
TM 14

PORT MANSFIELD,TX
GITI 12

PORT STRUCTURES
MP 4-75
R 3-70

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

PRESQUE ISLE,PA
R 3-66
R 1-69
TM 61

PRESSURE GAGES
TP 76-5

PRESSURE TREATED TIMBER
MR 76-4

PRESTON PROBE
R 3-71

PROFILES
CETA 79-2
MP 6-64
MP 2-69
MP 3-69
MP 10-75
MP 11-75
MR 77-5
MR 77-7
MR 77-12
MR 79-5
R 7-73
R 11-74
R 4-75
R 78-4
R 78-6
R 78-9
R 78-11
R 79-2
TM 49
TM 58
TP 76-11
TP 76-16
TP 77-1
TP 77-9
TP 77-10
TP 78-4
TP 78-5
TP 79-4
TR 76-1

PROTECTIVE COATINGS
TM 27

PT. MUGU,CA
R 9-73
TM 44
TM 58
TP 77-7

QUADRIPODS
R 2-69

QUARRYSTONE
TM 37
TP 76-19
TP 78-2

QUARTZ SAND
GITI 7
MP 1-69
TP 78-5

RADAR
R 17-73
R 79-8
TR 79-1

RADIOCARBON DATES
R 79-7

RADIOISOTOPES
MP 2-69
MP 4-70
TM 53

RECOLONIZATION RATES
TP 76-15

REFLECTION COEFFICIENT
MR 76-5

REMOTE SENSING
MP 2-73
MR 76-2
R 4-72
R 5-73
R 17-73
R 18-73
R 2-74
R 3-74
R 9-74

REVETMENTS
MP 1-64
MR 76-7

REST DOCUMENT AVAILABLE

KEYWORD INDEX

R 2-67
R 78-5
TM 55

RINCON ISLAND,CA
MR 78-3
R 78-14
R 79-4
TM 43

RIPPLES
TM 28
TM 62
TP 78-5

RIPRAP
R 3-67
R 76-2
TM 37
TM 51
TM 55
TP 76-19

RIPRAP STABILITY
R 76-2

RIST
MP 2-69
MP 3-70
MP 4-70
R 5-71
R 6-71
TM 53

ROCKAWAY BEACH,NY
R 79-9
R 78-10

ROLLOVER FISH PASS,TX
GITI 13

RUBBLE MOUND BREAKWATERS
MR 76-5
R 1-73
R 79-4

RUDEE INLET,VA
TM 8

RUSSIAN RIVER,CA
TM 14

SALMON BEACH,CA
MP 2-64

SALT MARSHES
MR 79-2
SR 4
TM 52
TP 76-7

SAMPLING ANALYSIS
CETA 79-3
TP 76-14

SAN FRANCISCO BAY,CA
MR 79-2

SAN PABLO BAY,CA
MR 79-2

SAND ANALYSIS
TM 33

SAND BYPASSING
TP 80-1

SAND FENCES
MP 1-70
MP 9-75
R 78-12
SR 3

SAND INVENTORY
CETA 80-4

SAND MINING
R 16-73

SAND PARTICLES
TP 76-6

SAND RIPPLES
TP 78-5

SAND SAMPLER
R 4-66

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

SAND SIZE ANALYSIS
MR 77-3

SAND TRACERS
TM 53

SANDBAGS
MR 77-4

SANTA CRUZ HARBOR,CA
R 2-69
R 8-71

SATELLITES
MR 76-2
R 4-72

SAVANNAH,GA
R 79-5

SEA BOTTOM CORES
TM 29

SEA BREEZE
MR 76-8

SEA ISLE CITY,NJ
R 79-3

SEA OATS
MR 76-3

SEA SLED
MR 76-11

SEASIDE PARK,CT
TM 11

SEAWALLS
MR 76-4

SEAWEED
MR 76-9

SEDIMENT BUDGET
R 78-3
TM 19

SEDIMENT SUSPENSION
TP 77-4

SEDIMENT TEXTURE
CETA 79-7

SEDIMENT TRACER
R 7-71

SEDIMENT TRANSPORT
CETA 79-2
CETA 80-6
GITI 7
GITI 8
GITI 9
GITI 10
GITI 12
GITI 17
MP 1-71
MR 77-1
MR 77-10
R 5-71
R 7-71
R 12-73
R 14-73
R 17-73
R 20-73
R 21-73
R 24-73
R 25-73
R 26-73
R 1-74
R 77-6
R 78-3
R 78-4
R 78-6
R 78-8
R 79-3
R 79-10
R 79-11
TM 1
TM 2
TM 10
TM 12
TM 14
TM 18
TM 19
TM 33
TM 62
TP 77-5
TP 77-9
TP 79-1

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

TP 80-1
TP 80-4

SEDIMENTATION
MP 1-66
R 77-1

SEDIMENTATION TANK
R 76-1

SEDIMENTS
CETA 80-4
MP 2-69
MP 2-70
MP 11-75
MR 76-1
MR 76-2
MR 76-10
MR 77-3
MR 77-7
MR 77-11
MR 77-12
MR 78-4
MR 79-3
MR 79-4
R 1-70
R 2-70
R 5-71
R 13-74
R 4-75
R 76-1
R 77-5
R 79-11
TM 1
TM 7
TM 9
TM 16
TM 29
TM 34
TM 38
TM 42
TM 45
TM 49
TM 54
TM 60
TM 61
TP 76-1
TP 76-2
TP 76-3
TP 76-6
TP 76-7
TP 76-11
TP 76-16
TP 76-20
TP 77-3
TP 77-5
TP 77-6
TP 79-2
TP 79-3

SEICHING
TP 77-8

SEISMIC PROFILES
R 79-1
TM 29

SEISMIC REFLECTION
MR 77-11
MR 79-3
MR 79-4
R 1-70
TM 34
TM 38
TM 54
TP 76-2
TP 76-3
TP 79-2

SEISMIC REFRACTION
TM 40

SEISMIC SEA WAVES
TM 25

SETTLING VELOCITIES
TM 9

SHEAR STRESSES
R 3-71
R 79-13

SHERWOOD ISLAND STATE PARK,CT
TM 20

SHOALING
R 77-1
R 79-11
TM 59

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

SHOALING RATES
R 76-1
TP 76-1

SHOALS
R 22-73

SHORE PROCESSES
MP 4-64
MP 6-64
MP 3-69
R 1-67

SHORE PROTECTION
R 79-9
TP 76-13

SHORELINE EVOLUTION
MR 77-10

SHORELINE STABILIZATION
TP 76-13

SILVER STRAND,CA
MP 1-71

SIZE DISTRIBUTION
TP 76-11

SMOOTH CORDGRASS
TM 46

SNOWS CUT,NC
TP 76-7

SOUTH LAKE WORTH INLET,FL
MP 1-71

SPARTINA ALTERNIFLORA
TM 46
TP 76-7
TR 76-2

SPATIAL HETEROGENEITY
TP 76-14

SPECTRAL ANALYSIS
R 6-74
TP 76-9
TP 76-10

SPECTRAL PARAMETERS
TP 80-2

SPOIL DISPOSAL
R 2-75
R 78-13
TM 39

STABILITY
R 3-67

STILLING WELL
TP 77-2

STORM SURGE
GITI 14
TM 26
TM 32
TM 35
TM 50
TM 56
TP 77-13
TR 76-3

STORMS
R 78-9
R 79-2
TM 49

STREAM FUNCTION WAVE THEORY
SR 1

SUBMERGENCE
R 78-7
R 78-11
TP 79-4

SURGE II COMPUTER PROGRAM
TP 77-13

SUSPENDED SEDIMENTS
MR 76-1
R 4-66
R 13-73
R 14-73
TM 21
TP 76-6
TP 76-20

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

TELEMETRY
MR 76-11

TERRACE EROSION
TP 76-16

TETRAPODS
TM 43

THERMISTOR
TM 3

THRESHOLD VEOLCITY
TM 1

TIDAL CURRENTS
TM 5
TM 7

TIDAL DISCHARGE
GITI 8
GITI 9

TIDAL HYDRAULICS
GITI 5
GITI 8
GITI 9
GITI 10
GITI 17

TIDAL INLETS
CETA 77-1
CETA 77-8
GITI 2
GITI 3
GITI 4
GITI 5
GITI 6
GITI 7
GITI 8
GITI 9
GITI 10
GITI 11
GITI 12
GITI 13
GITI 14
GITI 16
GITI 17
GITI 18
GITI 20
MP 3-74
R 10-73
R 11-73
R 10-74
R 76-4
R 79-10
TM 8

TIDAL PRISMS
CETA 77-8
GITI 3
GITI 12
MP 3-74

TIDE GATES
R 79-5

TIDES
GITI 14
R 79-5
TM 32
TP 76-1
TP 77-1

TIRES
MR 78-1
TP 78-3

TORREY PINES BEACH,CA
MP 11-75
TP 76-5

TRACERS
MP 2-69
MP 4-70

TRANSMISSION COEFFICIENT
CETA 79-6
MR 76-5

TRANSPLANTING
MR 76-3
MR 78-1
TM 22
TM 46
TP 76-13
TR 76-2

TRIBARS
TM 37

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

TROPHIDYNAMICS
TP 76-14

TSUNAMIS
CETA 78-1
GITI 14
SR 6
TM 25

TURBULENT BOUNDARY LAYER
R 13-73

TURBULENT FLOW
R 2-74

VEGETATION
CETA 77-3
CETA 77-4
CETA 77-6
CETA 80-2
MP 6-75
MP 7-75
MP 9-75
MR 76-3
MR 76-6
MR 77-8
MR 78-1
MR 79-2
R 78-2
R 78-12
SR 3
TM 46
TM 52
TP 76-13

VELOCITY MEASURESMENTS
R 6-73

VENTNOR,NJ
R 4-66
R 14-73
TP 77-5

VENTURA,CA
TM 33

VIRGINIA BEACH,VA
MP 6-64
MR 77-12
TM 5
TM 6
TM 7
TM 8
TM 9
TM 16
TM 17

WASHOVER DEPOSITS
TM 61

WASTE DISPOSAL
P 79-1

WATER TEMPERATURE
MR 77-7

WATER TUNNEL
MR 77-1

WAVE ANALYSIS
MP 1-67
R 2-73

WAVE ATTENUATION
CETA 77-6
MR 76-9
TP 76-17
TP 78-3

WAVE CHARACTERISTICS
R 2-73

WAVE CLIMATE
TP 77-9
TP 77-10
TR 77-1

WAVE CLIMATOLOGY
R 1-68
R 2-71
R 1-72
R 23-73
R 77-2

WAVE DIFFRACTION
R 79-6
TM 48
TM 57

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

WAVE ENERGY
TM 18

WAVE FORCES
R 2-66
R 79-5
SR 6
TM 13
TM 15
TM 24
TP 76-18
TP 76-19
TP 77-11
TP 78-1

WAVE FORECASTING
R 4-70

WAVE GAGE ARRAY
TP 76-5
TP 77-7

WAVE GAGES
MP 1-67
MP 12-75
MR 76-11
R 1-66
R 1-71
R 2-71
R 5-74
R 8-74
R 77-3
TM 21
TM 30
TP 77-7
TP 80-2
TR 77-1

WAVE GENERATION
CETA 77-6
TP 77-12

WAVE GENERATORS
TM 4

WAVE HEIGHT VARIABILITY
MR 77-7

WAVE HEIGHTS
CETA 79-4
CETA 80-1
TM 4
TP 80-3
TP 80-4
TR 77-1
TR 78-1

WAVE OVERTOPPING
CDM 76-1
CETA 77-7
R 77-7

WAVE PERIODS
TR 77-1
TR 78-1

WAVE RECORDS
R 1-71
R 6-74
R 7-74

WAVE REFLECTION
MR 76-5
MR 77-7
TP 76-8
TP 76-17

WAVE REFRACTION
R 78-3
R 79-6
TM 6
TM 17
TM 18
TM 47
TM 48
TM 57
TM 59
TP 80-3

WAVE RUNUP
CETA 77-2
CETA 77-7
CETA 78-2
CETA 79-1
MP 12-75
R 4-70
R 19-73
R 77-7
TP 78-1
TP 78-2

BEST DOCUMENT AVAILABLE

KEYWORD INDEX

WAVE SETUP
CETA 77-5

WAVE SPECTRA
TP 76-5
TP 76-9
TP 76-10

WAVE TANKS
MR 77-7
TP 76-12

WAVE TRANSFORMATION
R 77-4
TP 78-1

WAVE TRANSMISSION
CDM 76-1
CETA 79-4
CETA 79-6
MR 76-5
R 2-66
TP 76-8
TP 76-17
TP 78-3

WAVES
CETA 77-2
CETA 77-5
CETA 77-6
CETA 77-7
CETA 80-1
MP 4-64
MP 2-67
MP 3-69
MP 2-70
MR 76-9
MR 76-11
MR 77-1
MR 77-4
MR 77-5
MR 77-12
R 2-66
R 3-67
R 1-68
R 3-68
R 4-71
R 1-72
R 5-72
R 2-73
R 23-73
R 5-74
R 6-74
R 7-74
R 77-5
R 77-7
R 78-1
R 78-4
R 79-2
R 79-8
SR 1
SR 6
TP 76-8
TP.76-12
TP 76-17
TP 77-1
TP 77-2
TP 77-10
TP 77-12
TP 80-2
TR 79-1,

WEIR JETTIES
R 79-14

WESTHAMPTON BEACH,NY
MP 3-69
MR 79-5
TP 77-1

WIND
CETA 77-6
R 78-1
TM 1
TM 7

WIND TUNNEL
TM 1

WINDBLOWN SAND
MP 2-64

WIND-GENERATED WAVES
R 80-1
TP 76-12

BEST DOCUMENT AVAILABLE

APPENDIX C

KEYWORDS

BEST DOCUMENT AVAILABLE

KEYWORDS

A
ACOUSTIC FLOWMETER
ADDED MASS
AERIAL PHOTOGRAPHY
ALASKA
AMERICAN BEACHGRASS
AMPHIBIOUS VEHICLES
ANAHEIM BAY,CA
ANIMAL COLONIZATION
ARMOR UNITS
ARTIFICIAL ISLANDS
ARTIFICIAL REEFS
ARTIFICIAL SEAWEED
ATLANTIC CITY,NJ
ATLANTIC COAST
AUSTRALIA

B
BARRIER ISLANDS
BEACH CHARACTERISTICS
BEACH EROSION BOARD
BEACH EVALUATION PROGRAM-CERC
BEACH GEOMETRY
BEACH GRASSES
BEACH NOURISHMENT
BED FORMS
BEDLOAD
BENEDICT,MD
BENTHOS
BERRIEN COUNTY,MI
BIBLIOGRAPHIES
BIOLOGICAL COMPONENTS
BITTER PANICUM
BLUFF EROSION
BLUFFS
BOCA RATON,FL
BODEGA HEAD,CA
BOGUE SOUND,NC
BOLINAS LAGOON,CA
BOULDERS
BOUNDARY LAYER FLOW
BREAKERS
BREAKWATERS
BRIGANTINE,NJ
BROWARD COUNTY,FL
BROWN CEDAR CUT,TX
BRUNSWICK HARBOR,GA
BULK DENSITY
BULKHEADS

C
CAPE CANAVERAL,FL
CAPE COD,MA
CAPE FEAR,NC
CAPE HATTERAS,NC
CAPE KENNEDY,FL
CAPE MAY,NJ
CARTERET COUNTY,NC
CATALOGS
CATHODIC PROTECTION
CERC
CHANNEL ISLANDS,CA
CHESAPEAKE BAY
CHESAPEAKE LIGHT STATION
COASTAL ENGINEERING
COASTAL FAUNA
COMPUTER PROGRAMS
COMPUTERS
CONCRETE BLOCKS
CONCRETE JACKETS
CONTINENTAL SHELF
COORDINATE TRANSFORMATION
CORPUS CHRISTI PASS,TX
COVER LAYER
CRITICAL RATIO
CURRENT METERS
CURRENTS
CYLINDERS

D
DAMPING
DARE COUNTY,NC
DATA COLLECTION
DELMARVA PENINSULA
DEPOE BAY,OR
DEPOSITION
DIFFUSION
DIKES
DILLINGHAM,AK
DOCKS
DOLOS
DRAG COEFFICIENTS
DRAG FORCES
DRAKES BAY,CA

BEST DOCUMENT AVAILABLE

KEYWORDS

DREDGE SPOIL
DREDGING
DRUM INLET,NC
DUCK,NC
DUNE BUILDING
DUNE STABILIZATION
DUNES
DYE TRACERS

E
EARTHQUAKES
EAST BAY,TX
ECOLOGICAL SYSTEMS
ECOLOGY
ELECTRO-OPTICAL INSTRUMENT
ENERGY FLUX
ENERGY SPECTRA
ENVIRONMENTAL EFFECTS
EQUILIBRIUM PROFILES
EROSION
EROSION RATES
ERTS
ESSEX ESTUARY,MA
ESTUARINE ECOLOGY
ESTUARINE FISH
ESTUARINE PLANKTON
ESTUARINE SEDIMENTS

F
FALL VELOCITY
FAST FOURIER TRANSFORM
FERTILIZATION
FERTILIZERS
FIELD RESEARCH FACILITY-CERC
FILTERS
FISH
FIXED-BED MODELING
FLASH FLOODS
FLOATING BREAKWATERS
FLORISTICS
FLUID FLOW
FRICTION FACTOR
FRIDAY HARBOR,WA

G
GALVESTON BAY,TX
GALVESTON COUNTY,TX
GALVESTON ISLAND,TX
GAUSSIAN DISTRIBUTION
GEOLOGY
GEOMORPHOLOGY
GEOTECHNICAL ENGINEERING
GLACIAL BOULDERS
GLOSSARIES
GOBI BLOCKS
GOLDEN BEACH,FL
GRAIN SHAPE
GRAIN-SIZE DISTRIBUTION
GRASSES
GREAT LAKES
GROINS
GULF COAST
GULF OF CARPENTARIA
GULF OF MEXICO

H
HALF-TIDE HARBOR
HALLANDALE,FL
HARBORS
HEAVY MINERALS
HINDCASTING
HISTORY
HOLLYWOOD,FL
HUMBOLDT BAY,CA
HURRICANE CAMILLE
HURRICANE CARLA
HURRICANE ELOISE
HURRICANE GRACIE
HURRICANE SURGE
HURRICANE WAVES
HURRICANES
HYDRAULIC MODELS
HYDROGRAPHIC SURVEYS
HYPERION BEACH,CA

I
ICONS
IMPACT FORCES
IMPERIAL BEACH,CA
INLETS

BEST DOCUMENT AVAILABLE

KEYWORDS

INNER CONTINENTAL SHELF
INSTRUMENTATION
INTERLOCKING BLOCKS
IRREGULAR WAVE RUNUP
IRREGULAR WAVES
ISLAND BEACH,NJ

J
JETTIES
JONES BEACH,NY
JUPITER,FL

K
KNIK ARM,AK

L
LABORATORIES
LABORATORY WAVE FACILITIES
LAKE ERIE
LAKE LEVELS
LAKE MICHIGAN
LAKE MIGHICAN
LAKE OKEECHOBEE,FL
LAKESHORE PROCESSES
LEO
LETHAL EFFECTS
LIFT FORCES
LITTORAL BARRIERS
LONG BEACH ISLAND,NJ
LONG ISLAND,NY
LONGSHORE BARS
LONGSHORE ENERGY FLUX
LOW COST SHORE PROTECTION
LUDLAM ISLAND,NJ

M
MACROFAUNA
MACROINVERTEBRATES
MARINAS
MARINE ENGINEERING
MARINE LIMESTONE
MARINELAND,FL
MARKOV
MARSH ECOLOGY
MARSH PLANTS
MARSH VEGETATION
MASONBORO INLET,NC
MASS COEFFICIENTS
MASSACHUSETTS BAY
MATHEMATICAL MODELS
MEIOFAUNA
METEOROLOGICAL DATA
MIAMI,FL
MINERAL SOLIDS
MISQUAMICUT,RI
MISSION BAY,CA
MONITORING GUIDELINES
MONTEREY BAY,CA
MOORING FORCES
MORPHOLOGICAL CHANGES
MOVABLE-BED MODELING
MULTISPECTRAL SCANNER

N
NAGS HEAD,NC
NATURAL TRACERS
NEW BERN,NC
NEW RIVER INLET,NC
NEW YORK BIGHT
NEWPORT,CA
NORTH INLET,SC
NORTH PADRE ISLAND,TX

O
OAHE RESERVIOR,SD
OFFSHORE PLATFORMS
OFFSHORE STRUCTURES
ONSLOW COUNTY,NC
OOLITIC ARAGONITE
ORBITAL VELOCITY METERS
OUTER BANKS,NC

P
PACIFIC COAST
PACKERY CHANNEL,TX
PADRE ISLAND,TX

BEST DOCUMENT AVAILABLE

KEYWORDS

PALM BEACH,FL
PANAMA CITY BEACH,FL
PARKER ESTUARY,MA
PATENTS
PATUXENT RIVER,MD
PEAT DEPOSITS
PENTWATER HARBOR,MI
PERMEABILITY
PERMEABLE BREAKWATERS
PETROLEUM STORAGE SYSTEM
PHI GRADE SCALE
PHOTOGRAPHY
PHYTOSOCIOLOGY
PICTORIAL HISTORY
PIERS
PILES
PIPELINES
PISMO CLAMS
PISTON-TYPE WAVE GENERATOR
PLANT ECOLOGY
PLUM ISLAND,MA
POINT ARGUELLO,CA
POINT CONCEPTION,CA
POINT REYES,CA
PORT MANSFIELD,TX
PORT STRUCTURES
PRESQUE ISLE,PA
PRESSURE GAGES
PRESSURE TREATED TIMBER
PRESTON PROBE
PROFILES
PROTECTIVE COATINGS
PT. MUGU,CA

Q
QUADRIPODS
QUARRYSTONE
QUARTZ SAND

R
RADAR
RADIOCARBON DATES
RADIOISOTOPES
RECOLONIZATION RATES
REFLECTION COEFFICIENT
REMOTE SENSING
REVETMENTS
RINCON ISLAND,CA
RIPPLES
RIPRAP
RIPRAP STABILITY
RIST
ROCKAWAY BEACH,NY
ROLLOVER FISH PASS,TX
RUBBLE MOUND BREAKWATERS
RUDEE INLET,VA
RUSSIAN RIVER,CA

S
SALMON BEACH,CA
SALT MARSHES
SAMPLING ANALYSIS
SAN FRANCISCO BAY,CA
SAN PABLO BAY,CA
SAND ANALYSIS
SAND BYPASSING
SAND FENCES
SAND INVENTORY
SAND MINING
SAND PARTICLES
SAND RIPPLES
SAND SAMPLER
SAND SIZE ANALYSIS
SAND TRACERS
SANDBAGS
SANTA CRUZ HARBOR,CA
SATELLITES
SAVANNAH,GA
SEA BOTTOM CORES
SEA BREEZE
SEA ISLE CITY,NJ
SEA OATS
SEA SLED
SEASIDE PARK,CT
SEAWALLS
SEAWEED
SEDIMENT BUDGET
SEDIMENT SUSPENSION
SEDIMENT TEXTURE
SEDIMENT TRACER
SEDIMENT TRANSPORT
SEDIMENTATION
SEDIMENTATION TANK
SEDIMENTS

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KEYWORDS

SEICHING
SEISMIC PROFILES
SEISMIC REFLECTION
SEISMIC REFRACTION
SEISMIC SEA WAVES
SETTLING VELOCITIES
SHEAR STRESSES
SHERWOOD ISLAND STATE PARK,CT
SHOALING
SHOALING RATES
SHOALS
SHORE PROCESSES
SHORE PROTECTION
SHORELINE EVOLUTION
SHORELINE STABILIZATION
SILVER STRAND,CA
SIZE DISTRIBUTION
SMOOTH CORDGRASS
SNOWS CUT,NC
SOUTH LAKE WORTH INLET,FL
SPARTINA ALTERNIFLORA
SPATIAL HETEROGENEITY
SPECTRAL ANALYSIS
SPECTRAL PARAMETERS
SPOIL DISPOSAL
STABILITY
STILLING WELL
STORM SURGE
STORMS
STREAM FUNCTION WAVE THEORY
SUBMERGENCE
SURGE II COMPUTER PROGRAM
SUSPENDED SEDIMENTS

T
TELEMETRY
TERRACE EROSION
TETRAPODS
THERMISTOR
THRESHOLD VEOLCITY
TIDAL CURRENTS
TIDAL DISCHARGE
TIDAL HYDRAULICS
TIDAL INLETS
TIDAL PRISMS
TIDE GATES
TIDES
TIRES
TORREY PINES BEACH,CA
TRACERS
TRANSMISSION COEFFICIENT
TRANSPLANTING
TRIBARS
TROPHIDYNAMICS
TSUNAMIS
TURBULENT BOUNDARY LAYER
TURBULENT FLOW

V
VEGETATION
VELOCITY MEASURESMENTS
VENTNOR,NJ
VENTURA,CA
VIRGINIA BEACH,VA

W
WASHOVER DEPOSITS
WASTE DISPOSAL
WATER TEMPERATURE
WATER TUNNEL
WAVE ANALYSIS
WAVE ATTENUATION
WAVE CHARACTERISTICS
WAVE CLIMATE
WAVE CLIMATOLOGY
WAVE DIFFRACTION
WAVE ENERGY
WAVE FORCES
WAVE FORECASTING
WAVE GAGE ARRAY
WAVE GAGES
WAVE GENERATION
WAVE GENERATORS
WAVE HEIGHT VARIABILITY
WAVE HEIGHTS
WAVE OVERTOPPING
WAVE PERIODS
WAVE RECORDS
WAVE REFLECTION
WAVE REFRACTION
WAVE RUNUP
WAVE SETUP
WAVE SPECTRA
WAVE TANKS

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KEYWORDS

WAVE TRANSFORMATION
WAVE TRANSMISSION
WAVES
WEIR JETTIES
WESTHAMPTON BEACH,NY
WIND
WIND TUNNEL
WINDBLOWN SAND
WIND-GENERATED WAVES

Szuwalski, Andre

Bibliography of publications of the Coastal Engineering Research Center and the Beach Erosion Board / by Andre Szuwalski and Linda Clark. – Fort Belvoir, Va. : U.S. Army, Corps of Engineers Coastal Engineering Research Center, ; Springfield, Va. : available from National Technical Information Service, 1980.

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TC203 .S998 627

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